APPENDIX C

COST DEVELOPMENT SUMMARIES

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ACRONYMS/ABBREVIATIONS

BIOCHLOR	BIOCHLOR Natural Attenuation Decision Support System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DNA	deoxyribonucleic acid
DTSC	(California Environmental Protection Agency) Department of Toxic Substances Control
FBWZ	first water-bearing zone
FID	flame ionization detector
FS	feasibility study
ft^2	square feet
GC	gas chromatography
HRC	Hydrogen Release Compound
IC	institutional control
IR	Installation Restoration (Program)
ISB	*in situ* bioremediation
ISCO	*in situ* chemical oxidation
ISOTEC	In-Situ Oxidative Technologies, Inc.
µg/L	micrograms per liter
MCL	maximum contaminant level
MNA	monitored natural attenuation
O&M	operation and maintenance
ORP	oxidation-reduction potential
OSWER	Office of Solid Waste and Emergency Response
PID	photoionization detector
QA/QC	quality assurance/quality control
RACER	Remedial Action Cost Engineering and Requirements (System)
RAO	remedial action objective
RI	remedial investigation
RWQCB	(California) Regional Water Quality Control Board
SVE	soil vapor extraction

TDS	total dissolved solids
TOC	total organic carbon
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compounds

Appendix C
COST DEVELOPMENT SUMMARIES

This appendix documents the development of order-of-magnitude cost estimates for Installation Restoration (IR) Program Site 27 remedial alternatives evaluated in this Feasibility Study (FS) Report. The no action alternative (Alternative 1) has no associated costs and is therefore not discussed in this appendix.

These cost estimates are solely for comparing alternatives in this FS Report and should not be used for budgeting or planning purposes.

C1 METHODOLOGY

Cost estimates for this FS Report were prepared following United States Environmental Protection Agency (U.S. EPA) technical guidance (U.S. EPA 1988, 2000) and the National Oil and Hazardous Substances Contingency Plan. The Remedial Action Cost Engineering and Requirements System (RACER) was the primary source of cost data. Costs for site-specific or unique line items were based on vendor quotes. Microsoft Excel spreadsheets were used to tabulate costs on an annual basis and calculate present values in January 2005 dollars.

C1.1 Description of RACER

RACER cost models are based on generic engineering solutions for environmental projects, technologies, and processes. The engineering solutions were derived from historical project information, government laboratories, construction management agencies, vendors, contractors, and engineering analyses. The software used for estimating cost, RACER 2004, incorporates the most up-to-date engineering practices and procedures to accurately reflect current removal/remediation processes and pricing. When an estimate is developed in RACER, generic engineering solutions are customized by adding site-specific parameters to reflect project-specific conditions and requirements. The tailored plan is then translated into specific work items, priced using the current cost data. RACER incorporates and summarizes cost by the code of accounts that was developed by the interagency Cost Estimating Group for Hazardous, Toxic, and Radiological Waste Remediation.

Included in the capital costs developed by RACER are estimates for professional labor support to the remedial action. This labor support is calculated based on the technology employed and includes construction oversight and preparation of work plans (e.g., health and safety, sampling, quality control). Indirect cost estimates for the remedial action include items such as sales tax on purchased items, contractors' overhead, contractors' profits, bonds, and insurance costs. Engineering, another indirect cost item, varies for each alternative depending on the complexity of the remedial action.

The cost estimates presented in this FS Report have an accuracy of +50 percent to -30 percent, consistent with U.S. EPA remedial investigation (RI) and FS technical guidance (U.S. EPA 1988). It is important to note that costs prepared at this stage of a remediation

project can increase during final design and/or implementation. Such escalation is usually a result of scope changes that cannot be explicitly defined due to a lack of complete, accurate, and detailed information when the FS Report is prepared. Contingency allowances have therefore been added to the capital costs and operation and maintenance (O&M) costs at a rate of 20 percent to cover increases that may occur as a result of scope-related uncertainties.

C1.2 User-Defined Costs

It was not possible to develop RACER cost estimates for some elements of the alternatives because of certain site-specific or unique characteristics. The costs for these elements were estimated with quotes and other cost data from vendors, contractors, and previous cost estimates. These costs were evaluated and adjusted as necessary to account for inflation.

C1.3 Cost Estimate Components

Cost estimates for IR Site 27 remedial alternatives include capital costs, O&M costs, and contingency allowances. A description of each of these cost categories is provided below.

C1.3.1 CAPITAL COSTS

Capital costs consist of direct and indirect costs. Direct costs include expenditures incurred for equipment, labor, and materials needed to develop, construct, and implement a remedial action. Indirect costs include all other expenses necessary to support the construction that cannot be directly associated with a specific equipment item or remedial activity. Indirect costs include the following:

- health and safety items
- permitting and legal fees
- site supervision
- engineering
- contractor overhead and profit
- startup costs

These indirect expenditures are included in the detailed cost analysis, either as separate line items or as a percentage of the direct capital cost.

C1.3.2 OPERATION AND MAINTENANCE COSTS

O&M costs refer to those post-construction items necessary to assure the continued effectiveness of a remedial action. Typical O&M expenses include power, operating labor, consumable materials, purchased services (such as laboratory services), equipment

replacement, maintenance, sampling of monitoring wells, permit fees, annual reports, and periodic site reviews.

C1.3.3 CONTINGENCY ALLOWANCES

Contingency allowances are assumed to be 20 percent of the cost of each alternative. As noted in Section C1.1, contingency allowances have been added to the FS cost estimates to account for uncertainties in project scope. The size of the contingency allowance would be expected to decrease as cost estimates are prepared during subsequent phases of design, after a remedial alternative has been selected and is proceeding toward implementation.

C1.4 Present Value

Present value is calculated using present worth analysis, a method of evaluating alternative remedial action solutions when expenditures occur over different time periods. The costs for the various remedial action alternatives can be compared on the basis of a single figure for each alternative by discounting all future costs to a common year. This single figure, the present value, represents the amount of money which, if invested in the initial year of a remedial action and disbursed as needed, would be sufficient to cover all costs associated with that alternative.

The present worth of expenditures occurring over the life of a remedial action is determined using the formula:

$$PW = \sum_{t=1}^{n} \frac{x_t}{(1+i)^t}$$

where

PW = present worth

x_t = escalated expenditures for the remedial action in year t
(the escalation rate is assumed to be 0 percent per year for this FS)

i = annual interest or discount rate

t = number of years in which each expenditure occurs following start of construction

n = number of years following start of construction

The present value is calculated by adding the capital costs to the present worth of the O&M annual expenditures and periodic costs priced as of January 2005 (including contingency allowances). Because the alternatives may be completed at different times, the present value was calculated for each alternative on the basis of a real discount rate of 3.1 percent (using real discount rates [adjusted for inflation] from OMB Circular A-94 January 2005).

C1.5 General Assumptions

Assumptions that influence the cost of implementing remedial alternatives at IR Site 27 were based on general engineering practices and the requirements of RACER, when appropriate. The following general assumptions were used to develop cost estimates for each alternative in this FS Report.

- Total costs were calculated using a cost base of 2005 dollars.
- O&M cost would be incurred beginning in 2006 or 2007 and continue thereafter as required by each alternative.
- IR Site 27 is accessible. Specialized equipment or services, with the exception of those described in this FS Report, would not be required.
- All operations would be conducted using U.S. EPA Level D protective clothing.
- No disposal of hazardous materials is included unless specified.
- Work plan and safety and health plan preparation, technical oversight during planning, and implementation of work are included in the cost for professional labor.
- Contingency allowances are 20 percent of capital costs, O&M costs, and periodic costs.
- Monitoring would be performed per modeling estimates using the BIOCHLOR Natural Attenuation Decision Support System (BIOCHLOR) to achieve remedial action objectives (RAOs).

C2 COST ESTIMATES

This section identifies the site-specific assumptions and parameters used to estimate costs for Alternatives 3, 4A, 6A, 6B and 7. Table C-1 presents the major assumptions which influence costs for each alternative. The yearly costs and the present value for each alternative are provided in detail in Tables C-2 through C-6. For comparison, a summary of the estimated costs for these alternatives is presented in Table C-7.

In Appendix B, a sensitivity analysis was presented based on certain assumptions used in the BIOCHLOR model. In isolation, several key assumptions were decreased by one-half and increased by two times to demonstrate the sensitivity of the assumptions on the "Time to Decrease Below MCL." Cost estimates were not prepared for various results of the sensitivity analysis as the parameters may have limited applicability for site conditions.

C2.1 Alternative 3 – MNA and ICs

This alternative assumes that natural attenuation processes (e.g., biodegradation, adsorption, dilution) will reduce concentrations of chlorinated volatile organic compounds (VOCs) in groundwater to achieve RAOs. This alternative is included based on the following assumptions.

- Historical concentration trends indicate that reductive dechlorination is occurring in the subsurface at IR Site 27. These processes are likely to continue to reduce contaminant concentrations and thus further reduce potential risk.
- Vertical migration of chlorinated VOCs is limited to an estimated depth of 20 feet bgs.
- Contaminant migration in the subsurface is primarily horizontal. Contamination in shallow groundwater would not threaten the deeper water-bearing zone due to the presence of a saltwater interface.
- Contaminant concentrations in the shallow aquifer would continue to be tracked as part of the monitored natural attenuation (MNA) program.

Groundwater modeling was performed to assist in evaluating the effectiveness of Alternative 3 and to estimate the duration for ICs. The analytical model BIOCHLOR was used to predict the time to achieve RAOs in IR Site 27 groundwater if no engineered control or source area reduction measure were implemented. The model simulations performed to support this groundwater alternative (Appendix B) indicate that the VOC plume appears to be stable, with limited additional downgradient migration potential, and that RAOs would be achieved within 30 years for the Ferry Point Road plume and 70 years for the Building 168 plume.

This alternative includes the following components:

- monitoring program design, groundwater sampling and analysis
- ICs to restrict extraction of groundwater for domestic purposes
- periodic reviews

Based on the BIOCHLOR model simulation results, the duration of MNA and ICs under Alternative 3 is assumed to be 70 years.

Activities associated with MNA include collecting and analyzing groundwater samples from wells within and along the downgradient migration pathways of the plume. For FS cost estimating purposes, the monitoring program is assumed to utilize existing groundwater monitoring wells.

The frequency and number of groundwater sampling events would be higher at the beginning of the MNA program and reduce with time. It was assumed that groundwater from eight wells would be sampled quarterly for years 1 through 3, groundwater from six wells would be sampled semiannually for years 4 through 6, groundwater from six wells would be sampled annually for years 7 through 30, and groundwater from four wells would be sampled annually for the remainder of the assumed 70-year MNA program.

For FS cost estimating purposes, it is assumed that all groundwater samples collected under this alternative would be analyzed for VOCs and MNA parameters. Monitoring for natural attenuation parameters is included to aid in understanding natural attenuation progress and VOC concentration trends. Ferrous iron, conductivity, temperature, pH, oxidation-reduction potential (ORP), and dissolved oxygen would be measured with

hand-held equipment. An off-site laboratory would conduct analyses for VOCs and the following MNA parameters: dissolved gases, alkalinity, major anions, major cations, total organic carbon (TOC), and total dissolved solids (TDS). Annual monitoring reports would be prepared and submitted to the regulatory agencies for review.

Under Alternative 3, the actual institutional controls (ICs) to be employed would be established in the ROD and subsequent remedial design/remedial action documentation. The Navy would use its policy entitled Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions (Attachment B to this FS Report) for specifying and implementing ICs for this alternative. The objective of ICs under Alternative 3 would be to prohibit activities that could result in unacceptable exposure to groundwater COCs. ICs would be put in place to prohibit extraction of groundwater for domestic purposes, and to maintain access to monitoring wells for the MNA program. Figure C-1 depicts the portion of IR Site 27 assumed to be subject to ICs for groundwater. Alternative 3 does not include active source area treatment.

A key component of the ICs for this alternative would be proprietary land-use restrictions incorporated into a quitclaim deed(s) and Covenant to Restrict Use of Property agreement(s) with the California Environmental Protection Agency Department of Toxic Substances Control (DTSC). The Navy would employ a dual approach to include land-use restrictions in both Navy deeds of conveyance and in Covenant to Restrict Use of Property agreements with DTSC entered into pursuant to the March 2000 Memorandum of Agreement between the Navy and DTSC (Attachment A). The installation and construction of groundwater extraction wells would be prohibited unless approved by the Navy, U.S. EPA, DTSC, and San Francisco Bay Regional Water Quality Control Board (RWQCB). The land-use restriction might be released if the transferee demonstrates to the concurrence of the Navy, U.S. EPA, DTSC, and San Francisco Bay RWQCB that domestic exposure to groundwater at IR Site 27 no longer warrants ICs. In addition, a deed notice would be recorded to notify the public of the existence of the groundwater contamination.

For FS cost estimating purposes, it is assumed that groundwater sampling reports would be submitted to the agencies annually and that periodic reviews would be performed every 5 years over the 70-year MNA period to assess natural attenuation progress and plume stability. Reviews would be documented in a summary report issued to appropriate regulatory agencies. These reports might suggest modifications to the cleanup program as needed.

C2.2 Alternative 4A – ISB Source Area Treatment, MNA, and ICs

Alternative 4A is similar to Alternative 3 but would additionally employ anaerobic *in situ* bioremediation (ISB) technology to accelerate VOC contaminant degradation in the IR Site 27 plume. It is assumed that the proprietary Hydrogen Release Compound (HRC) technology would be used to accelerate biodegradation of VOCs. HRC would be injected into the source area aquifer zone in the areas shown on Figure C-2. HRC injection would

be accomplished by direct-push methods to enhance reductive dechlorination. Groundwater sampling would be performed as part of an MNA program to document the reduction in contaminant concentrations after treatment and demonstrate that residual contaminant levels are reduced over time through naturally occurring processes during the IC period. ICs would prohibit extraction of groundwater for domestic purposes. ICs would also prohibit actions that would interfere with activities associated with this alternative.

BIOCHLOR model simulations performed for this alternative (Appendix B) indicate that VOC concentrations should attenuate to RAO concentrations within 25 years after source area treatment for the Ferry Point Road plume, and 60 years for the Building 168 plume. Regulatory agencies may accept a less stringent end point for ICs if sufficient data are collected to show that attenuation is continuing. However, this conservative end point of 60 years derived from the BIOCHLOR model simulations is considered adequate for comparison purposes.

Major components of this alternative include ISB, MNA, and ICs. The assumed duration of ICs for Alternative 4A is 60 years.

Enhanced anaerobic ISB for this alternative would consist of a single application of electron donor compounds in the two areas of higher VOC concentrations, followed by MNA. The total treatment area is approximately 43,000 square feet (Figure C-2). For FS cost estimating purposes, it is assumed that a single injection event of HRC at 128 direct-push borings would enhance natural attenuation processes in the two treatment areas. The injections would be located on 20-foot centers, based on an estimated radius of influence of 10 feet. Details of this alternative (e.g., the number of borings and dose rates per boring for HRC) would be determined in the remedial design phase. The enhanced anaerobic ISB process should provide active treatment for VOC-impacted groundwater. No pilot-scale testing is assumed.

MNA for Alternative 4A would be similar to Alternative 3 that except the duration is assumed to be 60 years, based on BIOCHLOR model simulations (Appendix B). The sampling event frequency for this alternative is described below. For FS cost estimating purposes, the monitoring program is assumed to utilize existing groundwater monitoring wells. Monthly groundwater sampling and analysis of wells would be performed prior to and following the HRC injection to evaluate the remediation process for a total of 12 months. Both laboratory and field analyses would be conducted to establish baseline groundwater conditions. Ferrous iron would be analyzed using field test kits. Conductivity, temperature, pH, ORP, and dissolved oxygen would be measured using a flow-through cell equipped with multiple parameter probes.

For cost estimating purposes, it is assumed that an off-site laboratory would conduct analysis for VOCs and the same MNA parameters as under Alternative 3 (dissolved gases, alkalinity, major anions, major cations, TOC, and TDS). Additionally, organic acid analyses would be performed using gas chromatography/flame ionization detection to assess the dissolution of HRC in the aquifer. DNA [deoxyribonucleic acid] testing

(using quantitative polymerase chain reaction and terminal restriction fragment length polymorphism) and metabolic acid testing would be performed to confirm the presence of dechlorinating bacteria within the source area.

The frequency of groundwater sampling events would be higher at the beginning of the MNA program and reduce with time. It is assumed that groundwater from existing wells would be sampled on the following schedule.

- Year 1 would include monthly monitoring of eight wells for VOCs, DNA, and metabolic acids, and quarterly monitoring for all MNA parameters (as described under Alternative 3).
- Years 2 through 3 would include quarterly monitoring of eight wells for VOCs and all MNA parameters.
- Years 4 through 5 would include semiannual monitoring of eight wells for VOCs and annual monitoring for all MNA parameters.
- Years 6 through 25 would include annual monitoring of six wells for VOCs and all MNA parameters.
- Years 26 through 60 would include annual monitoring of four wells for VOCs and all MNA parameters.

For FS cost estimating purposes, the groundwater sampling techniques, field and laboratory analyses, and annual reporting are assumed to be the same as for Alternative 3.

ICs under Alternative 4A would be similar in scope to ICs for Alternative 3, with an assumed duration of 60 years.

Periodic reviews for Alternative 4A would be performed in the same manner as under Alternative 3. Reviews would occur every 5 years over the assumed 60-year project life.

C2.3 Alternative 6A – ISCO Source Area Treatment, MNA, and ICs

For Alternative 6A, *in situ* chemical oxidation (ISCO) would be used in a focused manner to oxidize VOCs in groundwater in two treatment areas in the IR Site 27 plume. The In-Situ Oxidative Technologies, Inc. (ISOTEC) chemical oxidation process would be employed to chemically destroy contaminants in groundwater in the two treatment areas. For FS cost estimating purposes, the two source areas shown on Figure C-2 are assumed to be treated using one treatment event across both treatment areas plus one additional "hot spot" injection event. MNA would document the reduction in contaminant concentrations after treatment and demonstrate that residual contaminant levels are reduced over time through naturally occurring processes during the IC period. ICs would prohibit groundwater extraction for domestic purposes at IR Site 27 and preclude actions that would interfere with activities associated with this alternative.

BIOCHLOR model simulations (Appendix B) performed for this alternative indicate that VOCs at IR Site 27 should attenuate to RAO concentrations across the VOC plume approximately 15 years after source area treatment for the Ferry Point Road plume, and in

approximately 45 years for the Building 168 plume. The agencies may accept a less stringent end point for ICs if sufficient data are collected to show that attenuation is continuing. However, this conservative end point of 45 years derived from the BIOCHLOR model simulations is considered adequate for comparison purposes.

Major components of this alternative include ISCO, MNA, and ICs. The assumed duration of Alternative 6A is 45 years.

For FS cost estimating purposes, it is assumed that treatment would occur over two areas with an approximate total area of 43,000 square feet. A 15-foot radius of influence at each application point is assumed for FS cost estimating purposes. Alternative 6A would employ an estimated 43 injection points in the western source area and 57 injection points in the eastern source area, for a total of 100 injection points. The injections would be performed using direct-push drilling technology, and applied via gravity through temporary injection screens. For FS cost estimating purposes, it is assumed that the injections would focus on a 10-foot-thick treatment zone for ISCO. Performance of the process would be evaluated through groundwater sampling and analysis. No pilot-scale testing is included.

Sampling for the first 6 months after implementing ISCO injection would be conducted during three sampling events using eight existing groundwater monitoring wells. Both laboratory and field analyses would be conducted. Ferrous iron would be analyzed using field test kits. Conductivity, temperature, pH, ORP, and dissolved oxygen would be measured using a flow-through cell equipped with multiple parameter probes. For cost estimating purposes, it is assumed that an off-site laboratory would analyze groundwater samples for VOCs, dissolved gases, alkalinity, major anions, major cations, TOC, and TDS.

After ISCO treatment, groundwater monitoring conducted as part of an MNA program would be the same as that described for Alternative 3 except that the duration is assumed to be approximately 45 years, based on BIOCHLOR model simulations (Appendix B), and the sampling event frequency would vary as described below. For FS cost estimating purposes, the monitoring program is assumed to utilize existing groundwater monitoring wells.

The frequency of groundwater sampling events would be higher at the beginning of the MNA program and reduce with time. It is assumed that groundwater from existing wells would be sampled on the following schedule.

- Three monitoring events for eight wells would occur in the first 6 months after ISCO treatment, as described above.
- Monitoring from month 6 through year 2 would include quarterly monitoring of eight wells for VOCs and all MNA parameters (as described under Alternative 3).
- Monitoring from years 3 through 15 would include annual monitoring of six wells for VOCs and all MNA parameters.

- Monitoring from years 16 through 45 would include annual monitoring of four wells for VOCs and all MNA parameters.

For FS cost estimating purposes, the groundwater sampling techniques, field and laboratory analyses, and annual reporting are assumed to be the same as for Alternative 3.

ICs under Alternative 6A would be similar in scope to ICs described for Alternative 3, with an assumed duration of approximately 45 years for FS cost estimating purposes.

As described for Alternative 3, periodic reviews would be performed every 5 years. The reviews would occur over the assumed 45-year project life.

C2.4 Alternative 6B – Sitewide ISCO Treatment and Groundwater Confirmation Sampling

For Alternative 6B, ISCO would be used to aggressively treat the entire IR Site 27 plume to reduce VOC concentrations to RAO concentrations, allowing for unrestricted use. The ISOTEC chemical oxidation process assumed for Alternative 6A would be employed under Alternative 6B to treat the entire 11-acre plume. For FS cost estimating purposes, the initial full-scale injection event would be completed in the area shown on Figure C-1. If needed, a subsequent hot spot injection would be performed at up to one-half of the full-scale injection points. Groundwater sampling would document the reduction in contaminant concentrations after sitewide ISCO treatment.

For FS cost estimating purposes, it is assumed that treatment would occur over the entire inland portion of the approximately 11-acre groundwater plume area. A 15-foot radius of influence at each application well is assumed; therefore, Alternative 6B would employ an estimated 570 injection points. The injection would take an estimated 50 days to complete, based on recent experience at IR Site 9. The injections would be performed using direct-push drilling technology, and applied via gravity through temporary injection screens. It is assumed that the injections would focus on a 10-foot-thick treatment zone for ISCO. Performance of the process would be evaluated through groundwater sampling and analysis. The initial injection would be followed by an additional hot spot injection event, as necessary, at up to one-half of the full-scale injection, or up to 285 injection points over an estimated 25 days. As with Alternative 6A, no pilot-scale testing is assumed to be necessary.

Groundwater confirmation sampling would be conducted every 2 months for 6 months using eight existing groundwater monitoring wells. Both laboratory and field analyses would be conducted. Ferrous iron would be analyzed using field test kits. Conductivity, temperature, pH, ORP, and dissolved oxygen would be measured using a flow-through cell equipped with multiple parameter probes. For cost estimating purposes, it is assumed that an off-site laboratory would analyze groundwater samples for VOCs, dissolved gases, alkalinity, major anions, major cations, TOC, and TDS.

Groundwater sampling under this alternative is assumed to be conducted for 3 years. For FS cost estimating purposes, the monitoring program is assumed to utilize existing

groundwater monitoring wells. It is assumed that groundwater from existing wells would be sampled on the following schedule.

- The schedule for the first 6 months of monitoring are as described above for Alternative 6A.
- Monitoring from month 7 through year 2 would include quarterly monitoring events for VOCs and all MNA parameters (as described under Alternative 3).
- Monitoring in year 3 would consist of one annual monitoring event at the end of year 3.

For FS cost estimating purposes, the groundwater sampling techniques, field and laboratory analyses, and annual reporting are assumed to be the same as for Alternative 3.

Because ISCO treatment is assumed to reduce VOC concentrations to levels below RAOs within 6 months, and Alternative 6B has a duration of only 3 years, periodic reviews would not need to be performed every 5 years. At the end of year 3, a project closeout report would be prepared.

C2.5 Alternative 7 – Dynamic Circulation Source Area Treatment, MNA, and ICs

Alternative 7 uses a proprietary well technology (Dynamic Subsurface Circulation) in association with MNA and ICs. The Accelerated Remediation Technologies, LLC, circulation well design utilizes soil vapor extraction (SVE), in-well air stripping, and in-well air sparging (Figure C-3). This combination of technologies creates circulation of treated groundwater outward from the treatment well through capillary fringe soil and back into the well for treatment. The reported radius of influence for this technology is up to 70 feet. For the purposes of this FS, it is assumed that a separate pilot-scale study would not be performed, since the area of a pilot-scale study would be similar in size to the targeted treatment areas for Alternative 7.

BIOCHLOR model simulations (Appendix B) performed for this alternative indicate that VOCs within the VOC plume should attenuate to RAO concentrations within 20 years after source area treatment for the Ferry Point Road plume, and 55 years for the Building 168 plume. Regulatory agencies may accept a less stringent end point for ICs if sufficient data are collected to show that attenuation is continuing. However, this conservative end point of 55 years derived from the BIOCHLOR model simulations is considered adequate for comparison purposes.

The principal components of this alternative include remediation system construction, O&M, MNA, and ICs. The assumed duration of Alternative 7 is approximately 55 years.

In order to implement Alternative 7 at IR Site 27, it is assumed that ten 6-inch-diameter remediation wells would be installed. Two remediation systems would be installed as part of this alternative: one just east of Ferry Point Road and one outside the western edge of Building 168. SVE piping, compressed air for in-well sparging, and electrical supply for the recirculation pumps would be run in trenches from the remediation systems to

each remediation well. Locations of the two remediation equipment compounds, ten remediation wells, and trenches are shown on Figure C-4.

Each remediation system would consist of an electrical panel, air compressor, SVE system, and two 1,000-pound vapor-phase granular activated carbon vessels for treatment of extracted soil vapor (Figure C-5). Concrete-filled bollards would be installed to protect equipment from traffic damage. Each system would be surrounded by chain-link fencing.

After construction is completed, a 1-month period of startup and equipment shakedown would be conducted. During the startup period, daily flow rates and photoionization detector (PID) readings of soil vapor influent, intermediate (between carbon vessels) and effluent sampling locations of both remediation systems would be recorded. Equipment adjustments also would be made to balance system operation. Dissolved oxygen and ORP readings would be conducted daily for the first week, and weekly for the remainder of the 1-month startup period.

O&M activities are assumed to extend for 1 year. During that period, the systems would be inspected at least weekly to measure vapor flow rates and to perform PID measurements. A total of 32 soil vapor samples are assumed to be collected for VOC analysis by U.S. EPA Method TO-15. Vapor-phase carbon would be changed out based on PID readings. For FS cost estimating purposes, it is assumed that both vessels from each remediation system would be changed out after 4 months and 8 months of operation. During the O&M period, groundwater sampling also would be performed as described below.

MNA for Alternative 7 would be similar to the program under Alternative 6A except that the duration is assumed to be approximately 55 years, based on BIOCHLOR model simulations (Appendix B) and the sampling would vary as described below. For FS cost estimating purposes, the monitoring program is assumed to utilize existing groundwater monitoring wells.

Monthly groundwater sampling and analysis would be performed prior to and following the startup of the remediation systems to evaluate the remediation process for a total of 6 months. Quarterly sampling would then be conducted through year 2. Both laboratory and field analyses would be conducted to establish baseline groundwater conditions. The monthly and quarterly groundwater samples would be analyzed for MNA parameters (as described under Alternative 3). Ferrous iron would be analyzed using field test kits. Conductivity, temperature, pH, ORP, and dissolved oxygen would be measured using a flow-through cell equipped with multiple parameter probes for all groundwater samples.

The frequency of groundwater sampling events would be higher at the beginning of the MNA program and would reduce with time. It is assumed that groundwater from existing wells would be sampled on the following schedule.

- Years 1 and 2 would include monthly/quarterly monitoring of eight wells for VOCs and MNA parameters as described above.

- Years 3 through 20 would include annual monitoring of six wells for VOCs and all MNA parameters.
- Years 21 through 55 would include annual monitoring of four wells for VOCs and all MNA parameters.

ICs under Alternative 7 would be similar in scope to ICs for Alternative 3, with an assumed duration of approximately 55 years for FS cost estimating purposes. The area subject to ICs is shown on Figure C-1.

Periodic reviews for Alternative 7 would be performed similarly to those described for Alternative 3. The reviews would occur every 5 years over the assumed 55-year project life.

C3 REFERENCES

United States Environmental Protection Agency. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. OSWER Directive 9355.1. EPA/540/G-89/004. Interim Final. October.

———. 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. OSWER Directive 9355.0-75. Washington, DC. July.

U.S. EPA. *See* United States Environmental Protection Agency.

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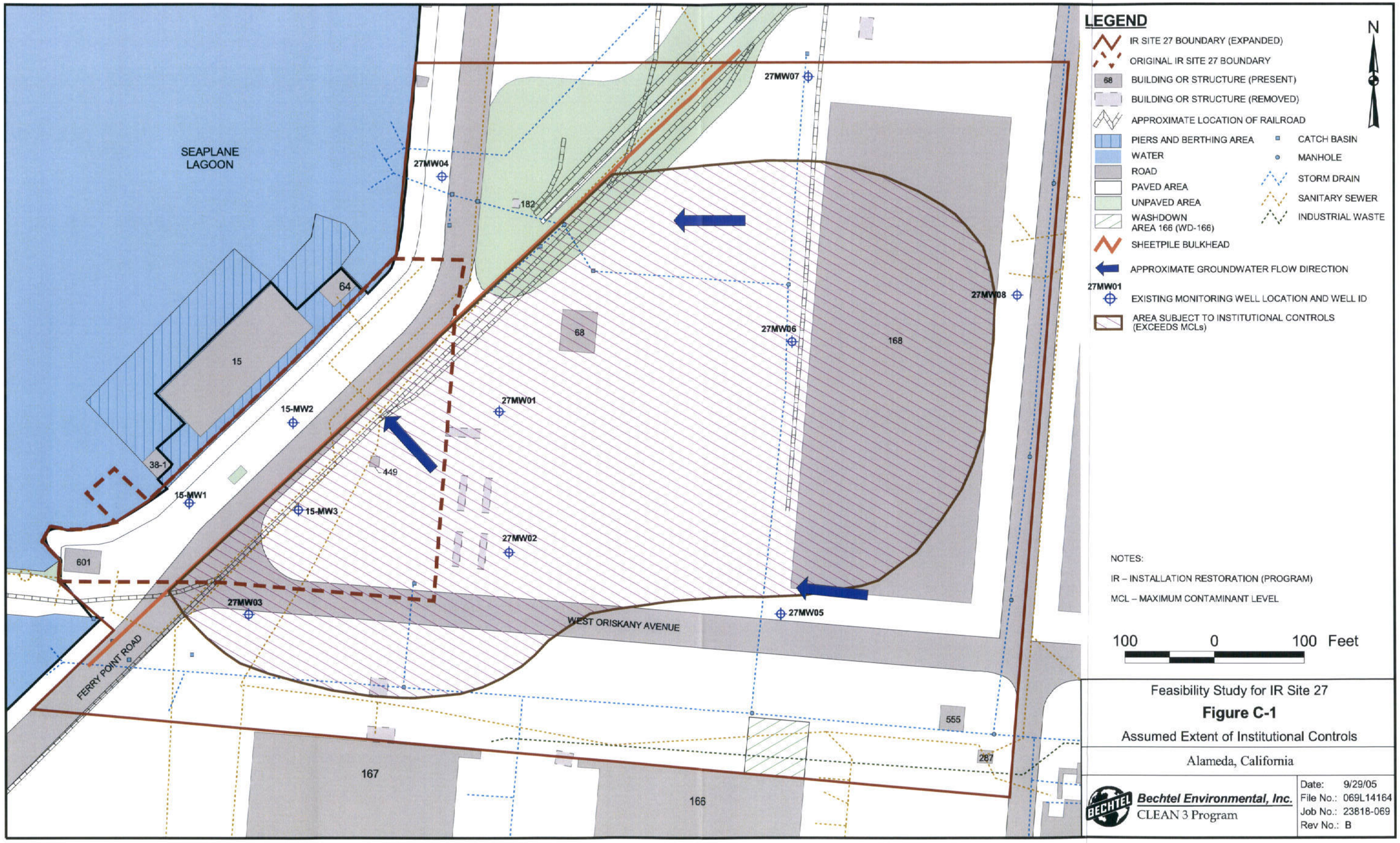
FIGURES

FINAL FEASIBILITY STUDY REPORT FOR IR SITE 27, DOCK ZONE

DATED 01 APRIL 2006



LEGEND

- IR SITE 27 BOUNDARY (EXPANDED)
- ORIGINAL IR SITE 27 BOUNDARY
- 68 BUILDING OR STRUCTURE (PRESENT)
- BUILDING OR STRUCTURE (REMOVED)
- APPROXIMATE LOCATION OF RAILROAD
- PIERS AND BERTHING AREA
- WATER
- ROAD
- PAVED AREA
- UNPAVED AREA
- WASHDOWN AREA 166 (WD-166)
- SHEETPILE BULKHEAD
- CATCH BASIN
- MANHOLE
- STORM DRAIN
- SANITARY SEWER
- INDUSTRIAL WASTE
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- 27MW01 EXISTING MONITORING WELL LOCATION AND WELL ID
- AREA SUBJECT TO INSTITUTIONAL CONTROLS (EXCEEDS MCLs)

N

NOTES:

IR – INSTALLATION RESTORATION (PROGRAM)

MCL – MAXIMUM CONTAMINANT LEVEL

100 0 100 Feet

Feasibility Study for IR Site 27

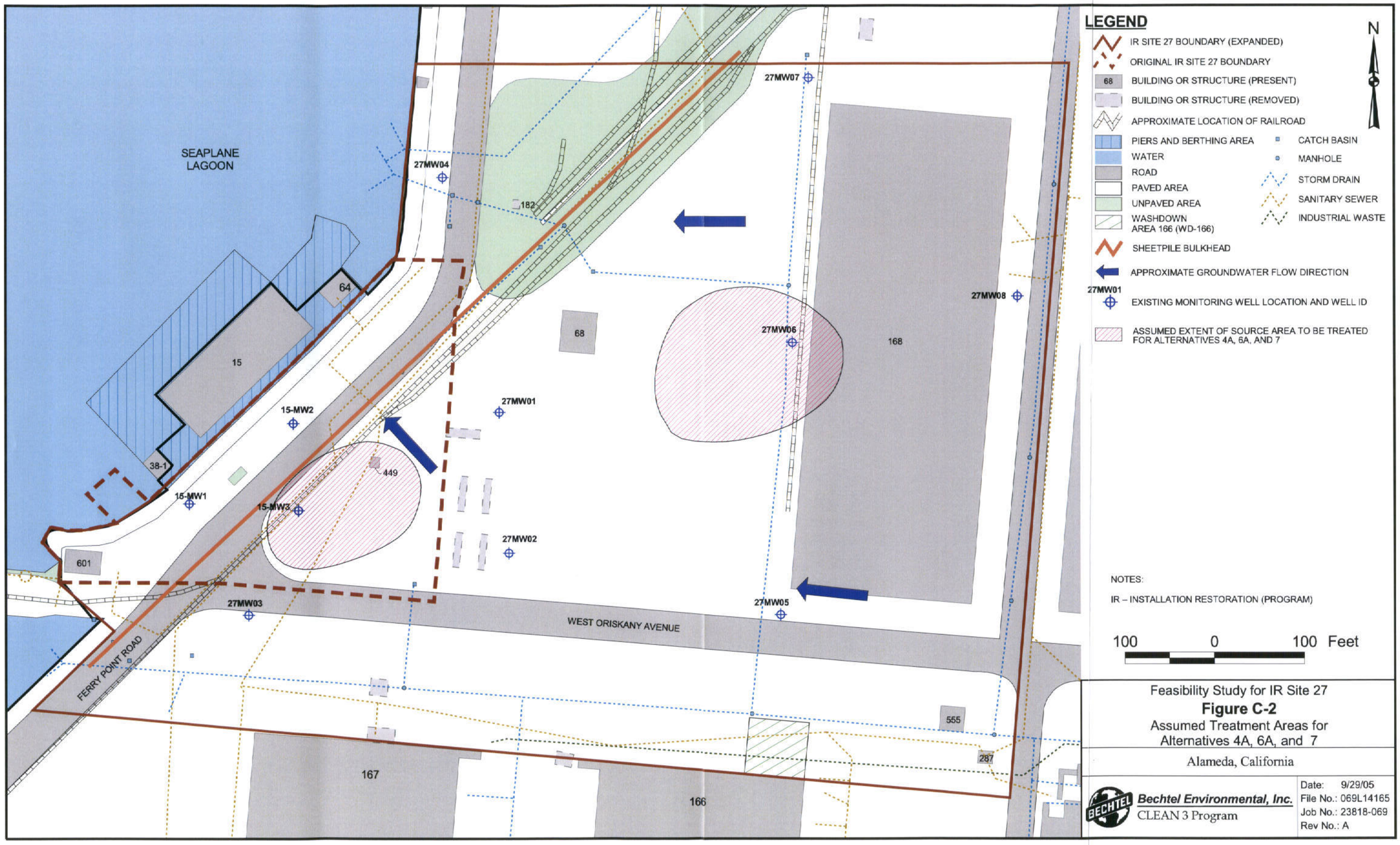
Figure C-1

Assumed Extent of Institutional Controls

Alameda, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 9/29/05
File No.: 069L14164
Job No.: 23818-069
Rev No.: B



Feasibility Study for IR Site 27

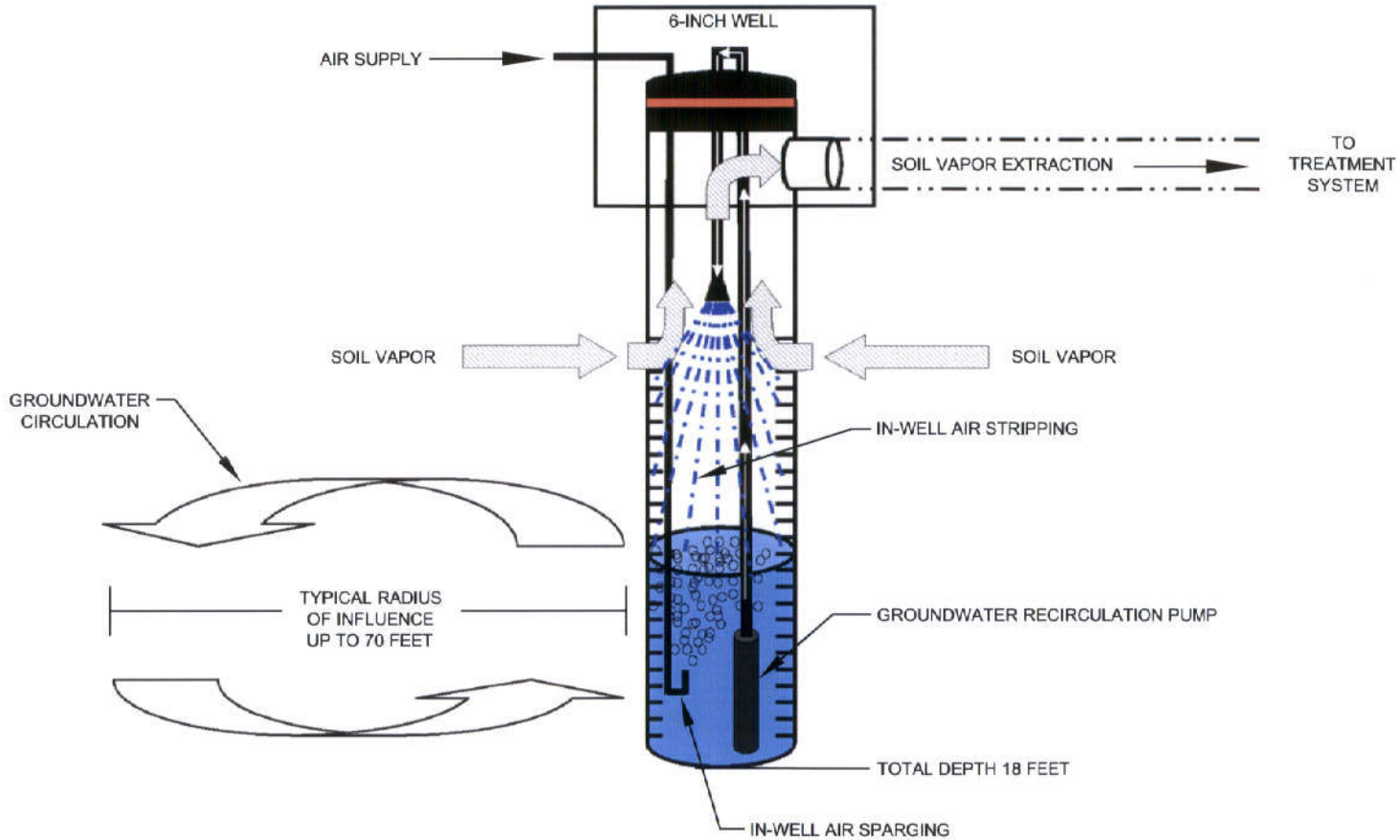
Figure C-2

Assumed Treatment Areas for Alternatives 4A, 6A, and 7

Alameda, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 9/29/05
File No.: 069L14165
Job No.: 23818-069
Rev No.: A



Feasibility Study for IR Site 27

Figure C-3

Schematic of Dynamic Circulation Well for Alternative 7

Alameda, California

NOTES:

NOT TO SCALE

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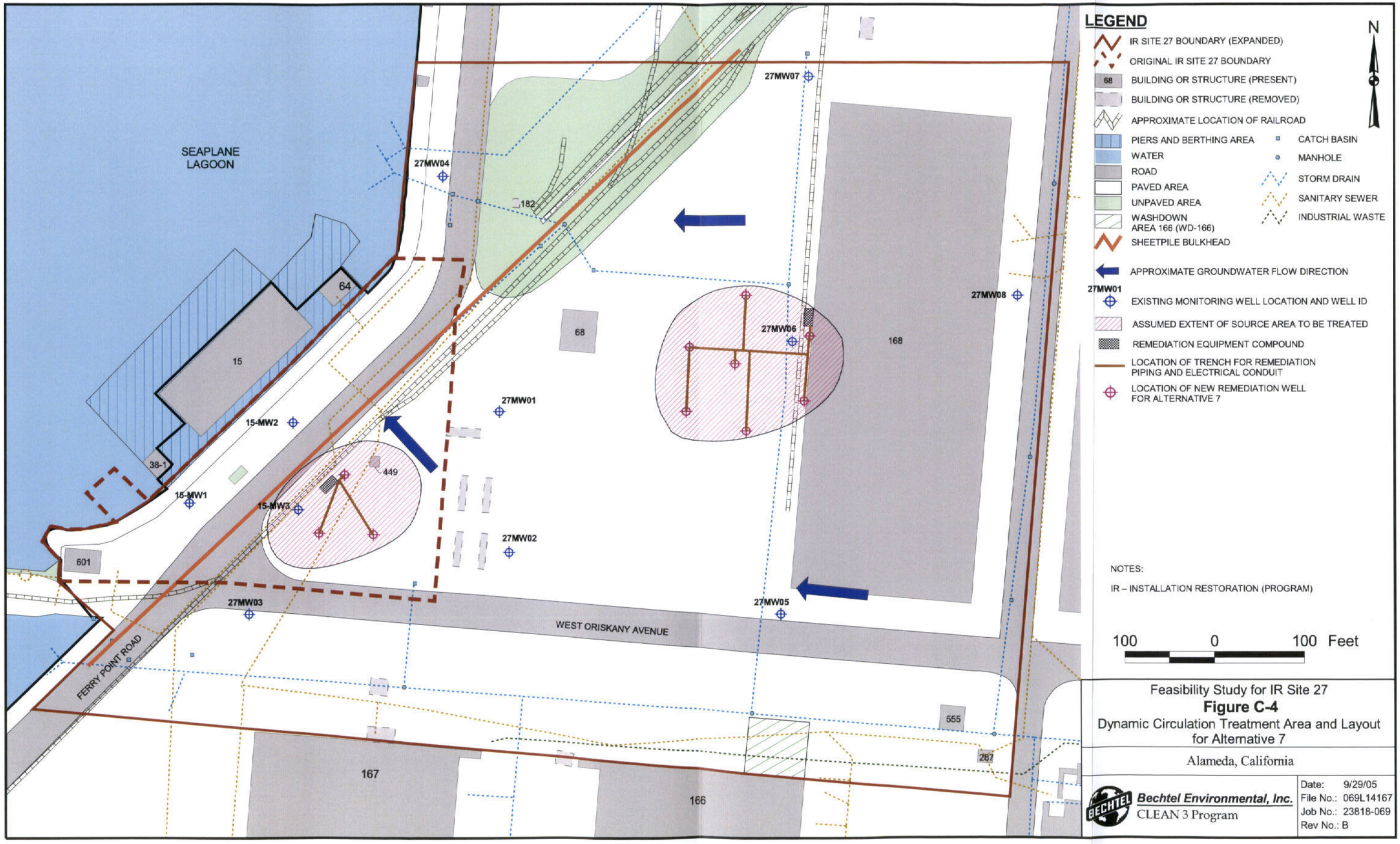
CLEAN 3 Program

Date: 9/29/05
File No: 069C14166
Job No: 23818-069
Rev No: A



LEGEND

- IR SITE 27 BOUNDARY (EXPANDED)
- ORIGINAL IR SITE 27 BOUNDARY
- 68 BUILDING OR STRUCTURE (PRESENT)
- BUILDING OR STRUCTURE (REMOVED)
- APPROXIMATE LOCATION OF RAILROAD
- PIERS AND BERTHING AREA
- WATER
- ROAD
- PAVED AREA
- UNPAVED AREA
- WASHDOWN AREA 166 (WD-166)
- SHEETPILE BULKHEAD
- CATCH BASIN
- MANHOLE
- STORM DRAIN
- SANITARY SEWER
- INDUSTRIAL WASTE
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- 27MW01 EXISTING MONITORING WELL LOCATION AND WELL ID
- ASSUMED EXTENT OF SOURCE AREA TO BE TREATED
- REMEDIATION EQUIPMENT COMPOUND
- LOCATION OF TRENCH FOR REMEDIATION PIPING AND ELECTRICAL CONDUIT
- LOCATION OF NEW REMEDIATION WELL FOR ALTERNATIVE 7

N

NOTES:

IR – INSTALLATION RESTORATION (PROGRAM)

100 0 100 Feet

Feasibility Study for IR Site 27

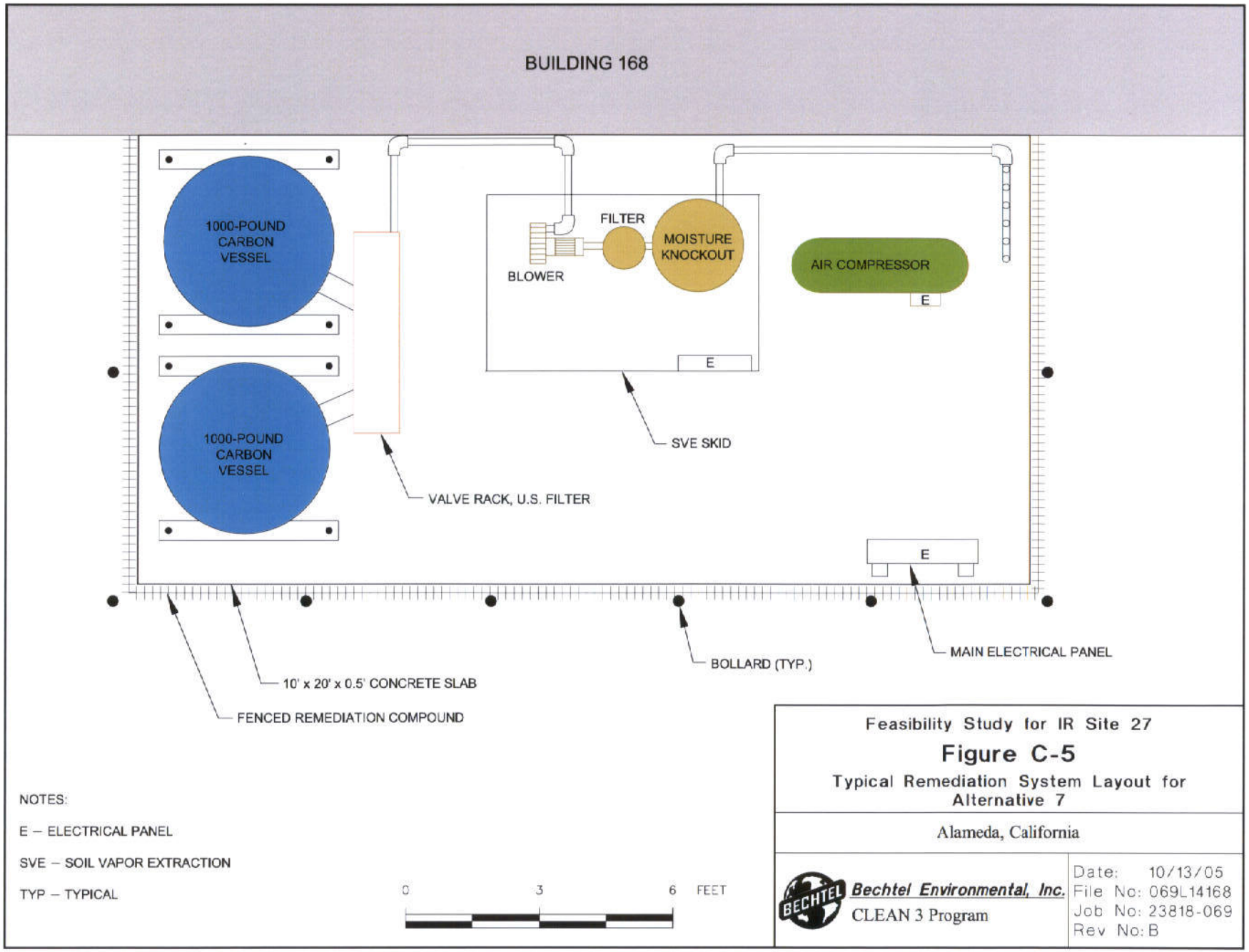
Figure C-4

Dynamic Circulation Treatment Area and Layout for Alternative 7

Alameda, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 9/29/05
File No.: 069L14167
Job No.: 23818-069
Rev No.: B


BUILDING 168
1000-POUND CARBON VESSEL
1000-POUND CARBON VESSEL
FILTER
MOISTURE KNOCKOUT
BLOWER
AIR COMPRESSOR
E
E
E
SVE SKID
VALVE RACK, U.S. FILTER
BOLLARD (TYP.)
MAIN ELECTRICAL PANEL
10' x 20' x 0.5' CONCRETE SLAB
FENCED REMEDIATION COMPOUND
NOTES:
E – ELECTRICAL PANEL
SVE – SOIL VAPOR EXTRACTION
TYP – TYPICAL
0
3
6
FEET
Feasibility Study for IR Site 27
Figure C-5
Typical Remediation System Layout for Alternative 7
Alameda, California
Bechtel Environmental, Inc.
CLEAN 3 Program
Date: 10/13/05
File No: 069L14168
Job No: 23818-069
Rev No: B

TABLES

FINAL FEASIBILITY STUDY REPORT FOR IR SITE 27, DOCK ZONE

DATED 01 APRIL 2006

Table C-1
Cost Estimate Assumptions for IR Site 27 Alternatives

ALTERNATIVE 3 – MNA AND ICs	
Components	**Assumptions**
Institutional controls	• Land-use control and implementation plan • Deed and covenant restrictions • Other activities (e.g., periodic drive-by) • Assumed duration of ICs is 70 years based on BIOCHLOR modeling results
Groundwater sampling and analyses for MNA	• No new monitoring wells are required • Existing on-site monitoring wells would be sampled • MNA sampling frequency: – eight wells sampled quarterly for years 1 through 3 – six wells sampled semiannually for years 4 through 6 – six wells sampled annually for years 7 through 30 – four wells sampled annually for years 31 through 70 • MNA analytical frequency: – years 1 through 3 – quarterly (VOCs and all MNA parameters) – years 4 through 6 – semiannually (VOCs each semiannual event; all MNA parameters once per year) – years 7 through 70 – annually (VOCs and all MNA parameters) • Field analysis (all sampling events): – disposable test kits: ferrous iron – rented equipment: conductivity, temperature, pH, ORP, DO • Laboratory analysis (all parameters): – dissolved gases (GC/FID) – alkalinity (U.S. EPA Method 310.1) – major anions (U.S. EPA Method 300) – major cations (U.S. EPA Method 6010) – total organic carbon (U.S. EPA Method 415.1) – total dissolved solids (U.S. EPA Method 160.1) – VOCs (U.S. EPA Method 8260B) – 20% QA/QC samples • Annual monitoring reports
Review reports	• Every 5 years

Table C-1 (continued)

ALTERNATIVE 4A – ISB SOURCE AREA TREATMENT, MNA, AND ICs	
Components	**Assumptions**
Institutional controls	• Land-use control and implementation plan • Deed and covenant restrictions • Other activities (e.g., periodic drive-by) • Assumed duration of ICs is 60 years based on BIOCHLOR modeling results
MNA enhancements (HRC injection)	• Injections in source area zones only (Figure 6-2) • Source areas total 43,000 square feet in size • Total of 128 direct-push injection points – 13 days of direct-push installation by drilling contractor – concrete coring required at each boring • 15,360 pounds of HRC material – supplied by Regenesis • Number of groundwater sampling events during the first year: – 12 sampling events for tracking of enhanced MNA effectiveness • Field analysis as described below • Laboratory analysis: – as described below – first 12 (monthly) sampling events include DNA (quantitative PCR and TRFLP) and metabolic acids (GC/FID)
Groundwater sampling and analyses for MNA	• Sampling frequency: – year 1 – eight wells monthly for VOCs, DNA (quantitative PCR and TRFLP), and metabolic acids; quarterly for all MNA parameters – years 2 through 3 – eight wells quarterly (VOCs and all MNA parameters) – years 4 through 5 – eight wells semiannually (VOCs each semiannual event; all MNA parameters once per year) – years 6 through 25 – six wells annually (VOCs and all MNA parameters) – years 26 through 60 – four wells annually (VOCs and all MNA parameters) • Field analysis: – disposable test kits: ferrous iron – rented equipment: conductivity, temperature, pH, ORP, DO • Laboratory analysis (all parameters): – dissolved gases (GC/FID) – alkalinity (U.S. EPA Method 310.1) – major anions (U.S. EPA Method 300) – major cations (U.S. EPA Method 6010) – total organic carbon (U.S. EPA Method 415.1) – total dissolved solids (U.S. EPA Method 160.1) – VOCs (U.S. EPA Method 8260B) – 20% QA/QC samples • Annual monitoring reports
Review reports	• Every 5 years

Table C-1 (continued)

ALTERNATIVE 6A – ISCO SOURCE AREA TREATMENT, MNA, AND ICs	
Components	**Assumptions**
Institutional controls	• Land-use control and implementation plan • Deed and covenant restrictions • Other activities (e.g., periodic drive-by) • Assumed duration of ICs is 45 years based on BIOCHLOR modeling results
ISCO source area treatment operation	• ISCO materials – one injection event, plus an additional "hot spot" event as needed • ISCO labor and materials cost supplied by ISOTEC • Assumed radius of influence: 15 feet • Injection points: – assume 43 injection points are required in western source area and 57 injection points in the eastern source area (100 points total) – temporary direct-push injection screens – 10-foot-thick treatment zone for ISCO • Number of groundwater sampling events during the first 6 months: three sampling events, eight wells sampled • Field analysis as described below • Laboratory analysis as described below
Groundwater sampling and analyses for MNA	• Sampling frequency: – month 6 through year 2 – eight wells quarterly (VOCs and all MNA parameters) – year 3 to year 15 – six wells annually (VOCs and all MNA parameters) – year 16 to year 45 – four wells annually (VOCs and all MNA parameters) • Field analysis: – disposable test kits: ferrous iron – rented equipment: conductivity, temperature, pH, ORP, DO • Laboratory analysis (all parameters): – dissolved gases (GC/FID) – alkalinity (U.S. EPA Method 310.1) – major anions (U.S. EPA Method 300) – major cations (U.S. EPA Method 6010) – total organic carbon (U.S. EPA Method 415.1) – total dissolved solids (U.S. EPA Method 160.1) – VOCs (U.S. EPA Method 8260B) – 20% QA/QC samples • Annual monitoring reports
Review reports	• Every 5 years

Table C-1 (continued)

ALTERNATIVE 6B – SITEWIDE ISCO TREATMENT AND GROUNDWATER CONFIRMATION SAMPLING	
Components	**Assumptions**
Institutional controls	• Land-use control and implementation plan • Deed and covenant restrictions • Other activities (e.g., periodic drive-by) • Assumed ICs are not required after ISCO treatment because RAOs will be reached within end of 1 year
ISCO source area treatment operation	• ISCO materials – one injection event, plus an additional "hot spot" event as needed • ISCO labor and materials cost supplied by ISOTEC • Assumed radius of influence: 15 feet • Injection points: – assume 570 injection points full-scale event – assume 285 injection points for one follow-up "hot spot" event – temporary direct-push injection screens – 10-foot-thick treatment zone for ISCO • Number of groundwater sampling events during the first 6 months: three sampling events, eight wells • Field analysis as described below • Laboratory analysis as described below
Groundwater sampling and analyses for MNA	• Number of wells sampled per event: eight wells • Sampling frequency: month 6 through year 2 – quarterly (VOCs and all MNA parameters) • One annual sampling event at the end of year 3 • Field analysis: – disposable test kits: ferrous iron – rented equipment: conductivity, temperature, pH, ORP, DO • Laboratory analysis (all parameters): – dissolved gases (GC/FID) – alkalinity (U.S. EPA Method 310.1) – major anions (U.S. EPA Method 300) – major cations (U.S. EPA Method 6010) – total organic carbon (U.S. EPA Method 415.1) – total dissolved solids (U.S. EPA Method 160.1) – VOCs (U.S. EPA Method 8260B) – 20% QA/QC samples • Annual monitoring reports
Review reports	• Closeout report at end of year 3

Table C-1 *(continued)*

ALTERNATIVE 7 – DYNAMIC CIRCULATION SOURCE AREA TREATMENT, MNA, AND ICs	
Components	**Assumptions**
Institutional controls	• Land-use control and implementation plan • Deed and covenant restrictions • Other activities (e.g., periodic drive-by) • Assume the duration of ICs is 55 years based on BIOCHLOR modeling results
Remediation well installation	• Coring through concrete up to 9 inches thick • Install ten 6-inch-diameter wells, schedule 40 PVC • Each well screened from 3 to 18 feet below ground surface • All investigation-derived waste disposed of as non-hazardous Class II waste • Each well completed in 2' × 2' × 2' concrete vault with traffic-rated cover
Remediation equipment compounds	• Two fenced remediation compounds, one in each source area • 10' × 20' × 0.5' concrete equipment slab for each area; concrete reinforced with welded wire fabric • Each compound enclosed with 6-foot chain link fence and two gates • Total of 20 4-inch bollards for traffic protection around the two treatment compounds • New oil-less air compressor for each treatment compound, one 1-HP compressor for western area and one 2-HP compressor for eastern area • Vapor extraction systems for each area with moisture knockout, high-level shutoff switch, and thermal overload; one 2-HP SVE system for western area, and one 5-HP SVE system for eastern area • Two 1,000-pound granular activated carbon vessels in each treatment compound (4 carbon vessels total) • Purchase pre-plumbed valve rack for carbon vessels for each treatment compound (two total) • All equipment bolted to concrete slab • Electrical meters, panels with main disconnect and breakers for compressor and SVE system at each treatment compound • Equipment and compound have no salvage value
Remediation system construction	• 150 feet of trenching for remediation system plumbing for western area, 450 feet for eastern area (600 feet total) • Utilities to each well include electrical conduit for 1/3-HP in-well recirculation pump, ½-inch air supply line for in-well sparging, and 2-inch PVC vapor extraction pipe to each remediation well • Accelerated Remediation Technologies, LLC, provides in-well equipment only, and constructs proprietary Dynamic Subsurface Circulation system in each remediation well

Table C-1 (continued)

ALTERNATIVE 7 – DYNAMIC CIRCULATION SOURCE AREA TREATMENT, MNA, AND ICs (continued)	
Components	**Assumptions**
Remediation system startup and 1-year operation	• Vapor phase carbon changeouts: Assume all four 1,000-pound vessels changed twice, once at four months, once at eight months (actual changeout frequency would be based on PID measurements; see Field analysis below) • Groundwater monitoring well sampling: – sampling conducted for eight existing monitoring wells – sampling conducted before startup, then monthly for 6 months, then quarterly for 1.5 years (including 1 year of postremediation monitoring) – samples analyzed for VOCs only – 20% QA/QC samples – field parameters for each groundwater monitoring event include pH, conductivity, DO, and ORP • Field analysis (groundwater and extracted soil vapor): – PID readings of influent, intermediate, and effluent for each SVE system daily for first month then weekly for 1 year – DO and ORP readings daily for first week, then weekly for remainder of first month, then monthly – vapor flow and temperature readings with electronic anemometer each site visit (daily for first month, then weekly for 1 year) • Laboratory analysis (soil vapor): – total of 32 samples for U.S. EPA Method TO15 (VOCs) – 20% QA/QC samples
Groundwater sampling and analyses for MNA	• First two years of groundwater monitoring are described above. • Annual sampling for six wells for years 3 through 20. • Annual sampling for four wells for years 21 through 55. • Field analysis: – disposable test kits: ferrous iron – rented equipment: conductivity, temperature, pH, ORP, DO • Laboratory analysis (all parameters): – dissolved gases (GC/FID) – alkalinity (U.S. EPA Method 310.1) – major anions (U.S. EPA Method 300) – major cations (U.S. EPA Method 6010) – total organic carbon (U.S. EPA Method 415.1) – total dissolved solids (U.S. EPA Method 160.1) – VOCs (U.S. EPA Method 8260B) – 20% QA/QC samples • Annual monitoring reports
Review reports	• Every 5 years

Table C-1 (continued)

Acronyms/Abbreviations:

BIOCHLOR – BIOCHLOR Natural Attenuation Decision Support System
DNA – deoxyribonucleic acid
DO – dissolved oxygen
FID – flame ionization detector
GC – gas chromatography
HRC – Hydrogen Release Compound
IC – institutional control
ISCO – *in situ* chemical oxidation
ISOTEC – In-Situ Oxidative Technologies, Inc.
MNA – monitored natural attenuation
ORP – oxidation-reduction potential
PCR – polymerase chain reaction
PVC – polyvinyl chloride
QA – quality assurance
QC – quality control
SVE – soil vapor extraction
TRFLP – terminal restriction fragment length polymorphism
U.S. EPA – United States Environmental Protection Agency
VOC – volatile organic compound

Table C-2
Cost Estimate Summary for
Alternative 3 – MNA and ICs

Description	Cost (dollars)
Remedial design costs[a]	
Remedial design	80,000
IC implementation plan	72,000
Total remedial design costs (based on 2005 dollars)	**152,000**
O&M costs[a]	
ICs (70 years)	700,000
Long-term monitoring (70 years)	1,164,000
5-year reviews	280,000
Total O&M costs (based on 2005 dollars)	**2,144,000**
Contingency (20 percent)	**459,000**
TOTAL COST	**2,755,000**
COMPARATIVE PRESENT VALUE COST (based on 2005 dollars)[b]	**1,407,000**

Note:
[a] includes indirect costs (overhead, profit)
[b] discount rate of 3.1 percent per year was used to calculate present value

Acronyms/Abbreviations:
IC – institutional control
MNA – monitored natural attenuation
O&M – operation and maintenance

Table C-3
Cost Estimate Summary for
Alternative 4A – ISB Source Area Treatment, MNA, and ICs

Description	Cost (dollars)
Remedial design costs[a]	
Remedial design	100,000
IC implementation plan	72,000
Total remedial design costs (based on 2005 dollars)	**172,000**
Capital costs[a]	
ISB aquifer amendments (HRC)	210,000
Total capital costs (based on 2005 dollars)	**210,000**
O&M costs[a]	
ICs (60 years)	600,000
Long-term monitoring (60 years)	1,300,000
5-year reviews	240,000
Total O&M (based on 2005 dollars)	**2,140,000**
Contingency (20 percent)	**504,000**
TOTAL COST	**3,026,000**
COMPARATIVE PRESENT VALUE COST (based on 2005 dollars)[b]	**1,962,000**

Note:
[a] includes indirect costs (overhead, profit)
[b] discount rate of 3.1 percent per year was used to calculate present value

Acronyms/Abbreviations:
HRC – Hydrogen Release Compound
IC – *institutional control*
ISB – *in situ* bioremediation
MNA – monitored natural attenuation
O&M – *operation and maintenance*

Table C-4
Cost Estimate Summary for
Alternative 6A – ISCO Source Area Treatment, MNA, and ICs

Description	Cost (dollars)
Remedial design costs[a]	
Remedial design	100,000
IC implementation plan	72,000
Total remedial design costs (based on 2005 dollars)	**172,000**
Capital costs[a]	
ISCO treatment	289,000
Total capital costs (based on 2005 dollars)	**289,000**
O&M costs[a]	
ICs (45 years)	450,000
Long-term monitoring (45 years)	760,000
5-year review	180,000
Total O&M costs (based on 2005 dollars)	**1,390,000**
Contingency (20 percent)	**370,000**
TOTAL COST	**2,221,000**
COMPARATIVE PRESENT VALUE COST (based on 2005 dollars)[b]	**1,532,000**

Note:
[a] includes indirect costs (overhead, profit)
[b] discount rate of 3.1 percent per year was used to calculate present value

Acronyms/Abbreviations:
IC – institutional control
ISCO – *in situ* chemical oxidation
MNA – monitored natural attenuation
O&M – operation and maintenance

Table C-5
Cost Estimate Summary for
Alternative 6B – Sitewide ISCO Treatment and Groundwater Confirmation Sampling

Description	Cost (dollars)
Remedial design costs[a]	
Remedial design	200,000
Total remedial design costs (based on 2005 dollars)	**200,000**
Capital costs[a]	
ISCO treatment	1,247,000
Total capital costs (based on 2005 dollars)	**1,247,000**
O&M costs[a]	
Groundwater confirmation sampling (3 years)	234,000
Annual report	10,000
Closeout report	50,000
Total O&M costs (based on 2005 dollars)	**294,000**
Contingency (20 percent)	**348,000**
TOTAL COST	**2,089,000**
COMPARATIVE PRESENT VALUE COST (based on 2005 dollars)[b]	**2,050,000**

Note:
[a] includes indirect costs (overhead, profit)
[b] discount rate of 3.1 percent per year was used to calculate present value

Acronyms/Abbreviations:
ISCO – *in situ* chemical oxidation
O&M – operation and maintenance

Table C-6
Cost Estimate Summary for
Alternative 7 – Dynamic Circulation Source Area Treatment, MNA, and ICs

Description	Cost (dollars)
Remedial design costs[a]	
Remedial design	200,000
IC implementation plan	72,000
Total remedial design costs (based on 2005 dollars)	**272,000**
Capital costs[a]	
Dynamic Subsurface Circulation system (east)	166,000
Dynamic Subsurface Circulation system (west)	111,000
Trenching for system piping	19,000
Remediation wells	21,000
Electrical power	39,000
Total capital costs (based on 2005 dollars)	**356,000**
O&M costs[a]	
Dynamic Subsurface Circulation system	133,000
ICs (55 years)	550,000
Long-term monitoring (55 years)	999,000
5-year reviews	220,000
Total O&M costs (based on 2005 dollars)	**1,902,000**
Contingency (20 percent)	**506,000**
TOTAL COST	**3,036,000**
COMPARATIVE PRESENT VALUE COST (based on 2005 dollars)[b]	**2,082,000**

Note:
[a] includes indirect costs (overhead, profit)
[b] discount rate of 3.1 percent per year was used to calculate present value

Acronyms/Abbreviations:
IC – institutional control
MNA – monitored natural attenuation
O&M – operation and maintenance

Table C-7
Summary of Cost Estimates for IR Site 27 Remedial Alternatives

Alternative	Duration of Alternative	Remedial Design Cost	Capital Cost	O&M Cost	Total Cost	Net Present Value*
Alternative 3 – MNA and ICs	70 years	$152,000	$0	$2,144,000	$2,755,000	$1,407,000
Alternative 4A – ISB source area treatment, MNA, and ICs	60 years	$172,000	$210,000	$2,140,000	$3,026,000	$1,962,000
Alternative 6A – ISCO source area treatment, MNA, and ICs	45 years	$172,000	$289,000	$1,390,000	$2,221,000	$1,532,000
Alternative 6B – sitewide ISCO treatment and groundwater confirmation sampling	3 years	$200,000	$1,247,000	$294,000	$2,089,000	$2,050,000
Alternative 7 – dynamic circulation source area treatment, MNA, and ICs	55 years	$272,000	$356,000	$1,902,000	$3,036,000	$2,082,000

Note:
* discount rate of 3.1 percent per year was used to calculate net present value

Acronyms/Abbreviations:
IC – institutional control
ISB – *in situ* bioremediation
ISCO – *in situ* chemical oxidation
MNA – monitored natural attenuation
O&M – operation and maintenance

APPENDIX D

RESPONSES TO COMMENTS

TABLE OF CONTENTS

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DRAFT RESPONSE TO COMMENTS ON
DRAFT FEASIBILITY STUDY REPORT, IR SITE 27, DOCK ZONE
ALAMEDA POINT, ALAMEDA, CALIFORNIA
DATED OCTOBER 2005
CTO-0069/0446

Comments from U.S. EPA, 1/23/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 1. It is unclear how the active remedies will address the shoreline groundwater, if at all. The bulkhead that runs through Site 27 is a key factor in dividing the salty, high TDS shoreline groundwater from the inland potential drinking water source quality groundwater. Therefore the bulkhead should be a component of the inland and the shoreline groundwater remedies.	**Response to General Comment 1.** Comment noted. Because of TDS values greater than 3,000 mg/L and proximity to Seaplane Lagoon, shoreline groundwater would be classified as Class III, as described in Section 2.4.6 of the FS Report; therefore, the Navy does not consider MCLs to be ARARs for shoreline groundwater. The following text has been added to the descriptions of each active alternative in Section 6: "Recent groundwater monitoring results indicate that VOCs in shoreline groundwater have attenuated to concentrations below RAOs. Therefore, no further action is proposed for shoreline groundwater. Sitewide groundwater monitoring (including selected shoreline wells as appropriate) would be conducted under Alternatives 3, 4A, 6A, and 7 to monitor the performance of the selected remedy for inland groundwater." Please refer to the response to Specific Comment 2 for a detailed response regarding the bulkhead as a component of the remedy.
General Comment 2. The alternative that evaluates ICs alone does not pass the threshold criteria for meeting ARARs, (MCLs), and should be eliminated from any evaluation.	**Response to General Comment 2.** Comment noted. Alternative 2 has been eliminated from further consideration in Section 5. Alternative 2 has been deleted from Sections 6 and 7. The first two sentences in the last paragraph in Section 5 have been revised as follows: "As shown in Table 5-2, Alternatives 2, 4B, 5, and 8 have been eliminated from further consideration. Alternative 2 has been eliminated based on low effectiveness, because no means would be provided to assess whether RAOs are achieved."

DRAFT RESPONSE TO COMMENTS ON
DRAFT FEASIBILITY STUDY REPORT, IR SITE 27, DOCK ZONE
ALAMEDA POINT, ALAMEDA, CALIFORNIA
DATED OCTOBER 2005
CTO-0069/0446

Comments from U.S. EPA, 1/23/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 3. All alternatives appear unreasonably long in duration with the exception of Alternative 6B. In this FS, the evaluation of the short term effectiveness criterion focuses almost exclusively on risks to workers and residents during implementation of the remedy, but fails to also evaluate the short term effectiveness based on the duration of the remedy before RAOs are achieved. All alternatives, with the exception of 6B, rate poorly in this respect.	**Response to General Comment 3.** Regarding the rankings of alternatives under the criterion of short-term effectiveness, it is the Navy's opinion that the ranking of alternatives in the FS is consistent with the NCP. In 40 C.F.R. § 300.430(e)(9)(iii)(E)(4), one of the subcriteria for short-term effectiveness is "time until *protection* is achieved" (emphasis added). The Navy interprets this to mean the time required to achieve short-term protection, not the end point of an MNA process (achievement of RAOs). At IR Site 27, the Navy's interpretation is that alternatives with ICs that prohibit domestic use of groundwater achieve short-term protection when the ICs are instituted. Alternative 6B does not include ICs; the short-term protection is achieved with groundwater treatment, which also achieves RAOs.
General Comment 4. In analyzing cost, we recommend that the Navy consider the total cost as well as the net present value. For example, the total cost for Alternative 6A is higher than Alternative 6B, but that does not appear to be included in the analysis.	**Response to General Comment 4.** The duration of MNA for Alternatives 3, 4A and 6A is based on the highest historically observed concentrations and conservative BIOCHLOR modeling assumptions. The actual duration of MNA for these alternatives is expected to be considerably shorter. The NCP states the following regarding the cost criterion (40 C.F.R. § 300.430[e][9][G]): "The types of costs that shall be assessed include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance costs; and (3) Net present value of capital and O&M costs." Therefore, total cost is not evaluated.

DRAFT RESPONSE TO COMMENTS ON
DRAFT FEASIBILITY STUDY REPORT, IR SITE 27, DOCK ZONE
ALAMEDA POINT, ALAMEDA, CALIFORNIA
DATED OCTOBER 2005
CTO-0069/0446

Comments from U.S. EPA, 1/23/2006

SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Executive Summary	
Specific Comment 1. Page ES-1, third paragraph, second sentence: It was EPA's understanding that data gap sampling for PCBs in the electrical substation and for VOCs and metals in soil and groundwater beneath the OWSs would also be included as part of the FS and the RD for Site 27. Please include these items in this section.	**Response to Specific Comment 1.** Comment noted. Please refer to the response to DTSC-GSU Specific Comment 2.
Specific Comment 2. Page ES-2, third complete sentence: As stated in General Comment #1, the continued maintenance of the bulkhead is critical to the implementation of the remedies for the inland groundwater and for the near shore groundwater.	**Response to Specific Comment 2.** The sheet pile bulkhead was installed without any cathodic protection, as part of the construction of this portion of Alameda Point. The Navy considers it unlikely that this structure will continue to provide a hydraulic barrier more than 70 years after its installation. What remains of the bulkhead may be acting as an unexpected permeable reactive barrier, providing zero-valent iron for abiotic reduction of chlorinated VOCs. Concentrations of VOCs have continued to decline, based on a review of ongoing monitoring program results. Remedial measures for inland groundwater are included in the active remedies in conjunction with monitoring (both shoreline and inland). The bulkhead is not considered to be critical to the implementation of any of the remedies.
Specific Comment 3. Page ES-2, Remedial Action Objectives: EPA does not agree that the RAOs should be only to protect existing uses, but that future beneficial uses should also be evaluated and protected.	**Response to Specific Comment 3.** The word "existing" has been deleted from the first two bullets under the Remedial Action Objectives heading in the Executive Summary and in Section 3.
Specific Comment 4. Page ES-3, third paragraph, second sentence: It is unclear what is meant by this sentence. Would ICs be necessary until MCLs are met? Please revise the wording.	**Response to Specific Comment 4.** Comment noted. The referenced sentence has been deleted. This paragraph has been revised to read as follows: "It is unlikely that future site occupants would extract groundwater for beneficial use at IR Site 27. However, for the purposes of this CERCLA cleanup, MCLs are potential ARARs for inland groundwater."

DRAFT RESPONSE TO COMMENTS ON
DRAFT FEASIBILITY STUDY REPORT, IR SITE 27, DOCK ZONE
ALAMEDA POINT, ALAMEDA, CALIFORNIA
DATED OCTOBER 2005
CTO-0069/0446

Comments from U.S. EPA, 1/23/2006

SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 5. Page ES-4, Alternative 2: ICs cannot be modeled and would need to be in effect in perpetuity. What is really being discussed here is MNA which is Alternative 3. Please see General Comment #2 and delete Alternative 2 from the document.	**Response to Specific Comment 5.** Comment noted. Alternative 2 has been screened out, as described in the response to General Comment 2.
Specific Comment 6. Page ES-5, Alternative 6B: The duration for this alternative is missing from the description. The duration has been given for all other alternatives.	**Response to Specific Comment 6.** The last sentence under Alternative 6B in the Executive Summary has been replaced with the following: "The assumed duration for Alternative 6B is 3 years. This includes an assumed 25-day treatment period followed by 3 years of groundwater confirmation sampling to document post-ISCO-treatment VOC concentrations in groundwater."
Specific Comment 7. Page ES-6, second to last paragraph, last sentence: Please note that Alternative 2 does not satisfy the threshold criteria for compliance with ARARs and so is ineligible for selection. It should not be carried through the comparison with the other alternative.	**Response to Specific Comment 7.** Comment noted. Please refer to the response to General Comment 2.
SECTION 1	
Specific Comment 8. Section 1.1, Purpose, Page 1-1: The purpose of the Regulatory Agencies is not to review documents and provide comments as stated in the last paragraph on this page, but to provide regulatory oversight to ensure protection of human health and the environment. Please revise the last sentence to provide a more accurate description of the role of the Regulatory Agencies.	**Response to Specific Comment 8.** This sentence has been revised to read: "...(RWQCB) for comment as part of the CERCLA process."

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 9. Page 1-1, Section 1.1, first paragraph, third sentence: Please add a sentence after this one that states that data gap sampling to determine whether PCBs are present will be conducted post-FS.	**Response to Specific Comment 9.** The following sentence has been added after the third sentence in Section 1.1: "Data gap sampling will be conducted in the vicinity of two oil/water separators at IR Site 27 and in the washdown area, as part of the remedial design process, as discussed in the RI Report."
Specific Comment 10. Section 1.1, Purpose, Page 1-2: The date Alameda Point was placed on the National Priorities List (NPL) is not included. Please include the data Alameda Point was placed on the NPL.	**Response to Specific Comment 10.** The date of listing on the NPL (July 1999) has been added to the first paragraph on page 1-2 as follows: "Alameda Point was added to the U.S. EPA National Priorities List (ID number . . .) in July 1999."
SECTION 2	
Specific Comment 11. Section 2.3, Remedial Investigation and Other Relevant Investigations and Activities, Page 2-5: The text of the fourth bullet states that additional characterization at oil water separators (OWSs) OWS-166A and OWS-166B was recommended in the Remedial Investigation (RI) Report, but EPA comments also requested soil and groundwater sampling in the vicinity of OWS-601. The fact that there is no OWS at present in Building 601 is not sufficient to evaluate whether contaminants were released from this OWS. Please revise the FS to include soil and groundwater sampling in the vicinity of and beneath former OWS-601.	**Response to Specific Comment 11.** OWS 601 was installed above the ground around 1980, as described in Section 1.3.3 of the final RI Report. This unit has been closed and no further action is required (BEI 2005). The Navy will prepare an NFA recommendation letter regarding OWS-601 for DTSC concurrence. The following sentence has been added to the fourth bullet on page 2-5: "OWS-601 was an aboveground OWS inside Building 601 that has been closed; no further action is required."
Specific Comment 12. Page 2-12, second full sentence: We question the purpose of this sentence since the groundwater clearly meets the definition of a Class II aquifer and will be cleaned to MCLs.	**Response to Specific Comment 12.** The referenced sentence points out that drinking water supply wells are not likely to be installed at IR Site 27. The sentence does not affect the determination of MCLs as ARARs for inland groundwater.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 13. Section 2.5.2, Analytical Results from Soil Samples, Page 2-13: The text of the second bullet indicates that the maximum detected concentration of benzene in soil was 600 micrograms per kilogram (ug/kg), but according to the RI Report, the maximum concentration of benzene was 660 ug/kg. Please resolve this discrepancy.	**Response to Specific Comment 13.** The typographical error in the second bullet has been corrected to indicate that 660 µg/kg is the maximum detected concentration of benzene in soil.
Specific Comment 14. Page 2-14, fifth bullet: The fact that arsenic is above MCLs will need to be addressed as part of the remedial action. Background for arsenic is around 3 ug/l, well below the federal MCL, so the arsenic present in the groundwater at Site 27 is due to site activities and an RAO of 10ug/l must therefore be set for the arsenic. The Navy believes that remediating the VOC plumes will serve to reduce arsenic concentrations. Nonetheless, an RAO for arsenic must still be included as part the evaluation of remedial alternatives, and as a performance measure for remedy effectiveness.	**Response to Specific Comment 14.** Arsenic concentrations (maximum 23.9 µg/L) in inland groundwater exceeded the MCL of 10 µg/L. Arsenic has been added to Table 3-1 as a COC for inland groundwater with an RAO of 10 µg/L. Arsenic concentrations in shoreline groundwater do not exceed surface water comparison criteria, so arsenic is not considered a COC for shoreline groundwater. Please refer also to the response to DTSC-OMF and HERD General Comment 1.
Specific Comment 15. Section 2.5.3, Analytical Results from Groundwater Samples, Page 2-14: The text identifies only 5 VOCs at concentrations above the maximum contaminant levels (MCLs), but 8 VOCs were identified in the RI Report as exceeding the MCLs. In addition to the VOCs listed in bullets 3 and 4, benzene, PCE, and 1,1-dichloroethane (1,1-DCA) also exceeded their respective MCLs. Please revise the FS to state that concentrations of benzene, PCE, and 1,1-DCA also exceeded MCLs.	**Response to Specific Comment 15.** To account for benzene, 1,1-DCA, and PCE, which exceeded MCLs only in shoreline wells, a third bullet under "...shoreline wells..." in Section 2.5.3 has been added as follows: • "five chlorinated VOCs (1,1-DCA; cis-1,2-DCE; PCE; TCE; and vinyl chloride) and one fuel-related VOC (benzene) at concentrations exceeding MCLs; however, due to high TDS in groundwater at the shoreline, MCLs are not applicable comparison criteria for shoreline groundwater"

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 16. Section 2.5.3.1, Shoreline Wells, Pages 2-14 and 2-15: The text states that the concentration of arsenic in groundwater did not exceed the California Toxics Rule (CTR), but the maximum concentration of arsenic (38 milligrams per liter [mg/l]) did exceed the CTR saltwater continuous concentration criterion of 36 mg/l). There are no CTR criteria for beryllium, iron, and molybdenum, so it is not correct to state that they did not exceed the CTR criteria. In addition, the concentration of mercury exceeded the CTR based on the San Francisco Bay Basin Plan. Please revise the text to state that arsenic and mercury were detected above CTR criteria and that there are no CTR criteria for beryllium, iron, and molybdenum.	**Response to Specific Comment 16.** The maximum arsenic concentration reported from any well at IR Site 27 was 23.9 µg/L from inland well 15-MW3. Therefore, arsenic did not exceed the CTR comparison criterion for shoreline wells or for any well at IR Site 27. These data are posted on Figure 4-13 in the RI Report (BEI 2005). For discussion of the remaining metals reported in groundwater from shoreline wells, the text has been revised. Section 2.5.3.1, second paragraph, third and fourth sentences, have been revised as follows: "Of these five metals, only arsenic and selenium have CTR criteria, and neither of these metals was reported at concentrations exceeding CTR criteria in samples from shoreline wells. Five metals (copper, lead, mercury, nickel, and zinc) were reported at concentrations exceeding CTR criteria; however, concentrations of these metals were not statistically different from Alameda Point background concentrations."
Specific Comment 17. Page 2-17, first full paragraph, second to last sentence: Like arsenic, MTBE will need to be addressed as part of the remedial action and the federal MCL of 13 ug/l must be included as an RAO.	**Response to Specific Comment 17.** Samples from four wells (15-MW1, 15-MW2, 15-MW3, and 27MW06) at IR Site 27 are being analyzed for MTBE as part of the basewide groundwater monitoring program (BGMP). Since the summer 2002 BGMP sampling event, 2 of 46 samples have contained concentrations which exceeded the MCL of 13 µg/L. In the two most recent monitoring events for which results are available (spring and summer 2005), none of the eight samples from the four wells contained MTBE at concentrations above the MCL (ITSI 2005, 2006). The Navy plans to conduct several additional monitoring events for MTBE as part of the BGMP. Since MTBE has not been detected recently at IR Site 27 at concentrations above the MCL, it is not appropriate to include the MCL for MTBE as an RAO.

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Specific Comment 18. Page 2-21, second sentence after first set of bullets: We continue to think it unlikely that Sites 19 and 22 would be potential sources for this groundwater plume since the concentrations at these sites are less than those found at the plume hot spots within Site 27.	**Response to Specific Comment 18.** The second, third, and fourth sentences in the fourth paragraph of Section 2.8 have been replaced with the following: "A less likely potential source is the migration of a hypothetical slug of VOCs released to groundwater upgradient of IR Site 27. VOCs have been reported in groundwater samples from IR Sites 19 and 22. However, reported VOC concentrations at these sites do not appear likely to indicate an off-site source."
SECTION 4	
Specific Comment 19. Page 4-8, Section 4.3.4.2: Has it been demonstrated that the degradation can continue past VC? This step is critical for MNA to be successfully adopted as a remedial measure.	**Response to Specific Comment 19.** In the shoreline area, a longer monitoring history is available for monitoring wells, and evidence of degradation past VC has been documented. For inland groundwater, the monitoring history is not sufficient to conclusively document VC degradation. MNA monitoring continues at IR Site 27; therefore, additional data will be available for decision makers to assess VC degradation in inland groundwater prior to the proposed plan and ROD. Please refer to the response to Specific Comment 28.
Specific Comment 20. Page 4-13, first bullet: Please clarify how the odor threshold can be lower than the detection limit for hydrogen sulfide gas.	**Response to Specific Comment 20.** The odor threshold for hydrogen sulfide in the literature varies from 0.0005 to 0.01 parts per million by volume (ppmv). ATSDR reports an odor threshold of 0.0005 ppmv (ATSDR 2006). Field instruments are not capable of detecting hydrogen sulfide at this concentration.

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Specific Comment 21. Section 4.3.8.4, In-Situ Chemical Oxidation, Page 4-19: The text of the third paragraph implies that interference from competing reactions is not a factor for Fenton's reagent, but there are more competing reactions when Fenton's reagent is used than there are when potassium permanganate is used. Please revised this paragraph to clarify that competing reactions occur when Fenton's reagent is used.	**Response to Specific Comment 21.** Competing reactions are described in the sixth bullet on page 4-20. The following sentence has been added after the third sentence in the fifth paragraph under the In-Situ Chemical Oxidation heading in Section 4.3.8.4: "Like permanganate, the optimum dose rate for Fenton's reagent will depend on the number of competing reactions in the aquifer."
Specific Comment 22. Section 4.3.8.4, In-Situ Chemical Oxidation, Pages 4-19 and 4-20: Fire and explosion can occur when Fenton's reagent is used in the presence of flammable vapors in the subsurface. The presence of benzene, pentane, hexane, and other volatile and flammable petroleum compounds in soil and groundwater suggests that this potential exists if traditional Fenton's reagent is used at Site 27. Discussion of the potential for fire and explosion when traditional Fenton's reagent is used will strengthen the case for using modified Fenton's reagent. Please revise the text to include a discussion of the potential for fire and/or explosion and specify that only modified Fenton's reagent can be used.	**Response to Specific Comment 22.** The following text has been added to the end of the fourth paragraph under the In-Situ Chemical Oxidation heading in Section 4.3.8.4: "The presence of hydrocarbons can pose a potential fire and explosion risk with traditional Fenton's reagent chemistry. At IR Site 27, hydrocarbons have been reported in soil and groundwater. The use of modified Fenton's chemistry would pose a lesser risk of fire or explosion because of the lower temperature produced in the aquifer."
SECTION 5	
Specific Comment 23. Page 5-2, Section 5.1.2: Please delete this alternative from consideration.	**Response to Specific Comment 23.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please see the response to General Comment 2.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 24. Section 5.1.5, Alternative 4B - Sitewide ISB Treatment, MNA, and ICs, Page 5-4 and Figure 5-1, Assumed Treatment Approach for Alternative 4B: Based on Figure 5-1, one of the two hot spot areas would not be treated, so it is not evident that this alternative would be implemented across the entire site as stated in the text. Please revise Figure 5-1 to include the injection points within the hot spots.	**Response to Specific Comment 24.** Alternative 4B includes the same hot spot treatment described under Alternative 4A, followed by (or concurrent with) installation of the seven treatment barriers. To clarify this point, the 128 source area injection points have been added to Figure 5-1.
Specific Comment 25. Section 5.1.7, Alternative 6A, Page 5-5: The number of injection points is not specified as it is for the other alternatives. Please specify the number of injection points.	**Response to Specific Comment 25.** The following text has been inserted before the last sentence in the first paragraph in Section 5.1.7: "Alternative 6A would employ an estimated 43 injection points in the western treatment area, and 57 injection points in the eastern treatment area, for an estimated total of 100 injection points."
Specific Comment 26. Page 5-7, Section 5.2: Please delete the second bullet on this page. Also, the reasons for eliminating Alternative 4B appear to be cost alone since Alternative 6B was retained and has even more injection points (570) than 4B.	**Response to Specific Comment 26.** Alternative 2 has been included and screened out in Section 5, as described in the response to General Comment 2. The second bullet has been deleted. The following text has replaced the rationale for the elimination of Alternative 4B in the last paragraph of Section 5.2: "Alternative 4B was eliminated, based on a comparison with other alternatives. Alternative 4B has higher costs than Alternative 6B, a longer duration (an assumed 5 years of MNA), and a need for ICs."
Specific Comment 27. Section 5.2, Screening of Remedial Alternatives, Pages 5-7 and 5-8, and Table 5-2, Screening Results for Remedial Alternatives: The statement that Alternative 8 was eliminated because it is difficult to inject zero-valent iron (ZVI) into shallow groundwater is unsupported. ZVI has been injected into shallow groundwater at Hunters Point Shipyard and other alternatives require	**Response to Specific Comment 27.** The ZVI process involves a slurry injection into the aquifer. This injection process must occur at a pressure sufficient to create fractures in the soil matrix. Based on a recent conversation with a ZVI vendor, ZVI injection into shallow groundwater at IR Site 27 is not advisable. The vendor recommended physical mixing (blending) with an excavator or similar means instead. This additional justification for screening out ZVI has replaced the last sentence in Section 5.2:

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 27 (continued). injection into shallow groundwater. Further, the ZVI injection pressure can be adjusted. Alternative 8 should be retained unless further justification is provided. In addition, Alternative 4B was eliminated because it was deemed difficult to implement 440 injection borings, but Alternative 6B, which involves 570 injection borings and a second round of up to 285 injection borings was retained. Please retain Alternative 8 or provide better justification for eliminating it. Please also retain alternative 4B or provide a better explanation for its elimination.	**Response to Specific Comment 27 (continued).** "Alternative 8 was eliminated because of the difficulty in injecting ZV1 slurry into shallow groundwater (6 feet bgs) with coarse-grained soils (ARS 2006)." The screening discussion and rationale for rejection of Alternative 4B has been revised to include additional reasons for its elimination in the fourth paragraph of Section 5.2 as follows: "Alternative 4B was eliminated based on comparison with other alternatives. Alternative 4B has higher costs than Alternative 6B, a longer duration (an assumed 5 years of MNA), and a need for ICs."
Specific Comment 28. Table 5-2: Please eliminate Alternative 2. What is being evaluated in this table under Alternative 2 is really MNA which is Alternative 3. In addition, please remove phrases such as "MNA would continue at the site, based on lines of evidence." The lines of evidence have not been established, as acknowledged on page 4-6, so it is unknown whether MNA is occurring, or continuing, and certainly this factor counts against selecting MNA as a remedial alternative.	**Response to Specific Comment 28.** Discussions about declining VOC concentrations, MNA, and the BIOCHLOR model have been deleted from Section 5.1.2. The sixth sentence in the first paragraph, and the entire third paragraph of Section 5.1.2, have been deleted. The second paragraph has been moved to Section 5.1.3. The following sentence has been added to the end of the first paragraph of Section 5.1.2: "ICs would have an assumed duration of 70 years." The Navy believes that sufficient evidence is available in the final RI Report and basewide groundwater monitoring program results to conclude that natural attenuation is occurring. Additional site-specific discussion and data regarding lines of evidence have been added to Section 4.3.4.1. Please refer to Attachment 1* for the text of the revised Section 4.3.4.1, including two new figures and a new table. * the contents of this attachment have been incorporated into the draft final Feasibility Study Report, and are therefore not reproduced here

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
SECTION 6	
Specific Comment 29. Page 6-1, second paragraph, second sentence: Please revise to state "Natural attenuation processes may be reducing some VOC concentrations in groundwater..."	**Response to Specific Comment 29.** Two sentences in the second paragraph have been replaced with the following text: "Under the BGMP, the Navy is currently collecting analytical data for natural attenuation parameters for IR Site 27, as discussed in Section 4.3.4.1. Based on the interpretation of these results, natural attenuation processes have reduced VOC concentrations at the site, and continued reduction is expected to occur. No other remedial actions have taken place for VOCs in groundwater at IR Site 27."
Specific Comment 30. Page 6-4, Section 6.1.5, last bullet: The duration period to achieve RAOs has not been sufficiently evaluated in comparing the alternatives. All alternatives except Alternative 6B take in excess of 30 years to achieve RAOs and so should rate poorly in meeting the short term effectiveness criterion.	**Response to Specific Comment 30.** The word "RAOs" in the last bullet on page 6-4 (Section 6.1.5) has been replaced with "protection" to be consistent with NCP language. Please refer to the response to General Comment 3 regarding short-term effectiveness.
Specific Comment 31. Page 6-6, Section 6.3.1.1: The groundwater footprint subject to ICs prohibiting extraction of groundwater would need to be larger than depicted on Figure 6-1. It would be necessary to ensure that no wells are located outside the plume area that could potentially draw the contaminated groundwater beyond the plume boundaries.	**Response to Specific Comment 31.** The footprint shown on Figure 6-1 of the draft FS Report indicates the extent of inland groundwater exceeding MCLs, based on Hydropunch data. For FS purposes, it has been assumed that no domestic wells will be permitted in this area at IR Site 27. Chemical concentrations in groundwater from shallow (10 feet bgs) Hydropunch samples near the edge of the footprint are at or near MCLs, and deeper groundwater that is likely to be extracted is presumed to contain concentrations below MCLs. Assuming that any domestic well would have a sanitary seal of at least 20 feet, the footprint shown should be protective for FS purposes. Details of the groundwater ICs will be developed in the remedial design stage.

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Specific Comment 32. Page 6-7, Section 6.3.1.2: EPA would require at a minimum annual reviews and reports of the effectiveness of the ICs for all remedies. The additional cost associated with annual reporting, rather than the five year reporting period used in the document, should be factored into all remedies with ICs as a component.	**Response to Specific Comment 32.** Alternatives with an IC component include annual IC maintenance and reporting costs of $10,000 per year. The specific activities associated with IC maintenance would be established in the remedial design stage.
Specific Comment 33. Section 6.3 1.2, Periodic Reviews, Page 6-7; Section 6.3.2.5, Short-Term Effectiveness, Page 6-8; and Section 6.3.2.7, Cost, Page 6-8: It is not appropriate to assume that ICs would only be in place for 70 years. Since groundwater monitoring is not included in Alternative 2, it cannot be assumed that attenuation is occurring, attenuation cannot be verified, and ICs must remain in place for perpetuity.	**Response to Specific Comment 33.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please refer to the response to General Comment 2.
Specific Comment 34. Page 6-7, Section 6.3.2.2: The logic used in this section is in error in that apparently only action-specific ARARs have been evaluated here. The alternatives have to comply with all ARARs (in this case MCLs).	**Response to Specific Comment 34.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please refer to the response to General Comment 2.
Specific Comment 35. Page 6-8, Section 6.3.2.4: Please remove this section, and the entire Alternative 2. What is being evaluated here is MNA. Further, statements such as "passive treatment of chlorinated VOCs through natural processes would continue to occur" are unsubstantiated and should be deleted.	**Response to Specific Comment 35.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please refer to the response to General Comment 2 and Specific Comment 28.
Specific Comment 36. Page 6-9, Section 6.4.1, third bullet: There cannot be an upward vertical hydraulic gradient at this site and therefore this claim cannot be used as a reason for not considering protection of the deeper aquifer necessary. (See my comment with regard to Site 9 and the Navy's subsequent deletion of this claim).	**Response to Specific Comment 36.** The phrase in the third bullet in Section 6.4.1 (now Section 6.3.1) referring to an upward vertical hydraulic gradient has been deleted.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 37. Section 6.4.1.1, Monitoring Program Design For MNA, Page 6-10: The FS states that groundwater will be sampled from eight wells, but it is not clear if additional wells are proposed or if the monitoring program design includes only the existing wells. Furthermore, it is not clear that the existing wells at IR Site 27 are adequate to monitor the migration and attenuation of the volatile organic compounds (VOCs). Areas to the north and south of the main axis of the plume are not covered by the existing monitoring network. Please revise the monitoring alternatives in the FS to include additional wells to monitor these areas, or clarify why additional wells were deemed unnecessary.	**Response to Specific Comment 37.** If additional monitoring wells are needed, the number, location and placement of these wells will be developed at the remedial design stage. For the purposes of this FS Report, additional monitoring wells do not have a significant impact on the comparative analysis of alternatives.
Specific Comment 38. Section 6.5.1, Description of Alternative (4A), Page 6-12 and Section 6.6.1.1, In-Situ Chemical Oxidation, Page 6-17: Since amendments will be injected into the subsurface, it is possible that portions of the plume will be displaced, but there are no monitoring wells north and south of the main axis of the plume to monitor displacement. Please revise these alternatives to include installation of additional wells to monitor potential plume displacement.	**Response to Specific Comment 38.** Please refer to the response to Specific Comment 37 regarding additional wells. New and existing wells can be used to monitor plume displacement. While the actual dose rates will be determined in the remedial design, additional details about the assumed injection volumes and possible plume migration have been included in discussions of Alternatives 4A, 6A and 6B in Section 6. The following sentence has been added to the first paragraph in Section 6.5.1.1 (now Section 6.4.1.1): "The assumed dose rate for HRC is 120 pounds per injection point." The following text has been added to the first paragraph in Sections 6.5.1.1 and 6.6.1.1: "The assumed dose rate for ISCO is 300 gallons per injection point. Measures to minimize possible plume migration during injection would be developed in the remedial design stage."

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Specific Comment 39. Page 6-13, first two bullets: EPA questions the intent of these two bullets. Firstly, hydropunch data yields discrete, rather than average, concentrations and the model should use the highest concentration values to determine the duration of clean up. Secondly, MCLs are ARARs and should be used as the end point calculation for plume clean up. It is not conservative but, rather, required. We are also confused by the sentence immediately following the bullets and would like an explanation of why ICs would be released prior to achieving ARARs.	**Response to Specific Comment 39.** The BIOCHLOR model utilized the highest concentrations from the Hydropunch values in predicting the duration of MNA. The second and third paragraphs (including the bullets) in Section 6.5.1 (now Section 6.4.1) have been deleted (including the reference to the release of ICs) and replaced with the following: "BIOCHLOR model simulations (Appendix B) performed for this alternative indicate that VOC concentrations should attenuate to RAOs within 60 years after source area treatment. This model is conservative because it is based on the highest VOC concentrations observed at IR Site 27. However, the BIOCHLOR modeling result of 60 years is adequate for comparison purposes. The assumed end point (i.e., MCLs) may be achieved sooner, in which case the ICs would be discontinued."
Specific Comment 40. Page 6-17, Section 6.6.1: See above comment.	**Response to Specific Comment 40.** The same change and revision described in the response to Specific Comment 39 has been made in the appropriate sections throughout the text of the FS Report.
Specific Comment 41. Section 6.7.1.3, Closeout Report, Page 6-22: The text states that a periodic review would not be required because Alternative 6B has a duration of 2 years, but a Five-Year Review is still required, in addition to the closeout report. In addition, some monitoring beyond the two year period would probably be required to verify that there is no rebound in VOC concentrations.	**Response to Specific Comment 41.** The following clarification has been added to the text of Section 6.7.1.3 (now Section 6.6.1.3) regarding the need for a 5-year review (italics indicate added text): "Because *ISCO treatment is assumed to reduce VOC concentrations to levels below RAOs within 6 months, and* Alternative 6B has a duration of only 3 years, periodic reviews would not need to be performed every 5 years..." One annual groundwater monitoring event at year 3 has also been added to the groundwater confirmation sampling program for Alternative 6B.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 42. Page 6-23, Section 6.7.2.5: The correct logic is applied in this section in evaluating short term effectiveness. The the same logic should be applied to all other alternatives.	**Response to Specific Comment 42.** Alternative 6B is the only alternative that does not include ICs; the short-term protection is achieved with sitewide ISCO treatment. Please refer to the response to General Comment 3.
Specific Comment 43. Section 6.8.1.1, Remediation System Construction, Page 6-24: Granular activated carbon (GAC) is not effective for treating vinyl chloride, which is present in groundwater at this site. Since detection of vinyl chloride would be interpreted as break-through, GAC would likely be changed out frequently, which would add to the cost of this alternative. Please revise this alternative to propose treatment that would remove vinyl chloride.	**Response to Specific Comment 43.** The Navy acknowledges that granular activated carbon has a lower affinity for vinyl chloride than other chlorinated VOCs. However, based on the low concentrations of vinyl chloride in soil gas and groundwater, granular activated carbon is assumed to be adequate for FS purposes. Daily monitoring is assumed to be conducted for the first month, followed by weekly monitoring to track carbon vessel consumption.
Specific Comment 44. Figure 6-1, Assumed Extent of Institutional Controls: The extent of institutional controls (ICs) as shown on this figure, appear to extend to exactly the limits of the VOC plume. It appears that if domestic use of groundwater is allowed outside this boundary, wells could be placed close enough to the plume to draw contaminants. Please revise the extent of ICs to provide an adequate buffer to be protective if wells were to be installed just outside the boundary.	**Response to Specific Comment 44.** Please refer to the response to Specific Comment 31.
SECTION 7	
Specific Comment 45. Page 7-2, Section 7.2: Please remove Alternative 2 from this list since it does not comply with ARARs.	**Response to Specific Comment 45.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please refer to the response to General Comment 2.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 46. Page 7-3, Section 7.3, last paragraph: Alternatives 4A and 6A, taking 45 and 55 years respectively to achieve RAOs, do not appear to significantly shorten the IC time frame.	**Response to Specific Comment 46.** The BIOCHLOR model used the highest observed VOC concentrations at IR Site 27 to calculate durations for MNA in the two plume areas for comparison purposes. The actual time to reach RAOs may be shorter because of the conservative nature of this model.
Specific Comment 47. Page 7-4, Section 7.5: Alternative 2 should be removed since it cannot be shown to achieve RAOs and doesn't meet ARARs. Alternative 3 takes 70 years to achieve RAOs and so, even though it is easy to implement, it doesn't satisfy the short term effectiveness criterion from a duration to reach RAOs standpoint.	**Response to Specific Comment 47.** Please refer to the responses to General Comments 2 and 3.
Specific Comment 48. Page 7-6, Section 7.10: Please note that Alternative 2 also fails to meet the threshold criteria.	**Response to Specific Comment 48.** Please refer to the response to General Comment 2.
Specific Comment 49. Section 7.7, Cost, Page 7-6: This section and Table 7-1 rank alternatives according to the magnitude of cost (e.g., low cost ranks low, high cost ranks high); however, from an FS perspective, low cost is more desirable than high cost, therefore the rankings should be reversed.	**Response to Specific Comment 49.** The rankings have been reversed and explained in Section 7.7 and Table 7-1.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
	References for Specific Comments: Agency for Toxic Substances and Disease Registry. 2006. At www.atsdc.cdc.gov/toxprofiles/tp114.html. ATDSR. *See* Agency for Toxic Substances and Disease Registry. ARS Technologies, Inc. (At www.arstechnologies.com.) 2006. Telephone conversation between S. Drugan (BEI) and S. Chen (ARS) regarding ZVI injection technology applicable at IR Site 27. February 9. Bechtel Environmental, Inc. 2005. Draft Final Remedial Investigation Report, IR Site 27, Dock Zone, Alameda Point, Alameda, California. July. BEI. *See* Bechtel Environmental, Inc. Innovative Technical Solutions, Inc. 2005. Spring 2005 Alameda Basewide Groundwater Monitoring Report. Alameda Point, Alameda, California. July. ———. 2006. Telephone conversation between A. Acharya (ITSI) and M. Dermer (BEI) regarding groundwater monitoring analytical results from summer 2005. February 23. ITSI. *See* Innovative Technical Solutions, Inc.

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Comments from U.S.EPA, Office of the Regional Counsel, 1/23/2006

ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
Additional Comment 1. Page ES-7, last paragraph and Section 7.10, page 7-6, Comparison of rating of alternatives. The summary comparison of alternatives is not entirely appropriate at the FS stage; moreover, it is not explained how the comparison was made. It is also misleading: for example, it suggests there is a major difference between Alternatives 6A and 6B, apparently without considering factors such as Alternative 6B's lower total cost. We recommend omitting the summary comparison.	**Response to Additional Comment 1.** The Navy's position is that a comparative presentation of the alternatives is appropriate for review by the agencies and community at the FS stage, and is required by the NCP (§ 300.430[e][9][i] and [iii]).
Additional Comment 2. Page ES-6 indicates that all alternatives except for Alternative 1 (no action) meet threshold criteria. EPA disagrees. Alternative 2 (ICs) does not meet ARARs because MCLs will not be achieved. [Same comment for page 7-2].	**Response to Additional Comment 2.** Please refer to the response to General Comment 2.
SECTION 3, RAOs	
Additional Comment 3. Page 3-1, general RAOs, first bullet: Please remove the phrase "to the extent practicable".	**Response to Additional Comment 3.** The phrase "to the extent practicable" has been deleted from the first bullet on page 3-1.
Additional Comment 4. Section 3.4, page 3-7, last paragraph, discussion of dilution. EPA is not convinced that use of a mixing zone/dilution analysis is appropriate to determine compliance with the CTR numbers that are proposed as RAOs for the shoreline groundwater. We prefer measuring compliance with CTR standards at the point where the groundwater discharges to the surface water.	**Response to Additional Comment 4.** The Navy has determined that shoreline groundwater already meets the RAOs before entering the surface water. Therefore, the consideration of dilution in a mixing zone for IR Site 27 is not necessary, since the surface water RAOs are already met in groundwater. Please see the response to RWQCB Specific Comment 7.

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ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
SECTION 5, Development and Screening of Remedial Alternatives	
Additional Comment 5. EPA disagrees with retention of the IC remedy since it will not meet ARARs (MCLs). Additionally, the discussion of the IC remedy relies heavily on MNA. Since MNA/ICs is presented as a separate alternative, it is unnecessary to retain the IC remedy.	**Response to Additional Comment 5.** Alternative 2 has been screened out in Section 5 and deleted from Sections 6 and 7. Please refer to the response to General Comment 2.
Additional Comment 6. It is not clear whether the alternatives discussed in this chapter are aimed at the shoreline groundwater as well as the inland groundwater. For example, Alternative 6B, page 5-5, is described as aggressively treating "the entire IR Site 27 inland groundwater plume," but there is no discussion of whether this alternative would also address the shoreline groundwater.	**Response to Additional Comment 6.** Because shoreline groundwater already meets RAOs, no active treatment is proposed for this area. Please refer to the response to General Comment 1.
SECTION 6, Detailed Analysis of Remedial Alternatives	
Additional Comment 7. Section 6.3.1.2, page 6-7, periodic reviews of ICs. EPA does not consider reviews every five years to be sufficient, and would require at least annual monitoring to ensure that ICs are being implemented effectively.	**Response to Additional Comment 7.** Please refer to the response to Specific Comment 32.
Additional Comment 8. Section 6.3.2.1, page 6-7, Alternative 2, Overall Protectiveness Criterion. It is unclear how this criterion addresses the general response objective of protecting existing beneficial uses of surface water adjacent to IR Site 27. The same comment applies to other alternatives where there is inadequate discussion of the shoreline groundwater.	**Response to Additional Comment 8.** Please refer to the responses to General Comment 1 and Specific Comment 3.

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ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
Additional Comment 9. Section 6.3.2.2, page 6-7, Alternative 2, Compliance with ARARs. Elsewhere in the document, MCLs are included as ARARs for the inland groundwater. This alternative will not comply with those ARARs.	**Response to Additional Comment 9.** Please refer to the response to General Comment 2.
Additional Comment 10. Section 6.3.2.7, page 6-8. Alternative 2, Cost. The cost would have been higher to cover monitoring of the ICs at least annually.	**Response to Additional Comment 10.** Please refer to the responses to General Comment 2 and Specific Comment 32.
Additional Comment 11. Section 6.5.1, page 6-13. EPA disagrees with the statement that the regulatory agencies may accept a less stringent end point for ICs if sufficient data are collected to show that attenuation is continuing. ICs would need to continue until MCLs are attained. We have a similar comment for the similar discussion on page 6-17 and 6-24.	**Response to Additional Comment 11.** Reference to the early release of ICs has been deleted from this section. Please refer to the response to Specific Comment 39.
APPENDIX A, ARARs	
Additional Comment 12. Page A2-7, and Table A2-2, Page 2, ACLs. The Navy should consider the new OSWER Memorandum 9200.4-39, Use of Alternative Concentration Limits (ACLs) in Superfund Cleanups, in deciding whether to include ACLs. EPA also questions why the Navy is including the ACL discussion at all – specifically, what are the otherwise applicable concentration limits? Does the Navy consider the CTR requirements to be ARARs for the shoreline groundwater?	**Response to Additional Comment 12.** The referenced OSWER directive is not a potential ARAR. Although the site does seem to meet the criteria for using CERCLA ACLs as stated in the cited OSWER memorandum, ACLs are not necessary since it has been determined that the shoreline groundwater is not a potential drinking water source where MCLs would be potential ARARs. The text and associated table of the ARARs analysis in Appendix A has been revised to include this determination. The Navy does not consider CTR requirements as an ARAR for shoreline groundwater. However, CTR requirements were identified as potential surface water ARARs since groundwater is flowing toward the surface water.

Comments from U.S.EPA, Office of the Regional Counsel, 1/23/2006

ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
Additional Comment 13. Page A2-13, discussion of dilution. See comment above. Additionally, it is not appropriate to rely on provisions of the California Ocean Plan, which does not apply to the Seaplane Lagoon.	**Response to Additional Comment 13.** See response to Additional Comment 4 above. Reference to the Ocean Plan has been removed.
Additional Comment 14. Page A2-16. It is confusing and inaccurate to refer to the "Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" as Phase 1 of the Inland Surface Waters Plan" or as the "Inland Surface Waters Plan," as the ISWP was a separate plan that was rescinded by the State Board many years ago in response to a court ruling. EPA generally refers to the document identified as SWRCB 2000 as the "SIP," and would suggest something like the "Toxic Standards SIP" to refer to this document.	**Response to Additional Comment 14.** The reference to the SIP has been revised to exclude "Phase 1 of the Inland Surface Waters Plan" and "Inland Surface Waters Plan."
Additional Comment 15. Section. A3.2.4.1, page A3-8, ESA. EPA disagrees with the characterization of consultation regulations as possible TBCs, because TBCs generally refer to nonpromulgated or otherwise not legally-enforceable substantive standards or criteria. EPA nevertheless recommends that consultation regulations be complied with when appropriate.	**Response to Additional Comment 15.** The text has been revised to exclude TBCs from the discussion. Instead, the guidance has been included as suggested.
Additional Comment 16. Table A2-2, page 3. It is unclear why surface water ARARs are included. We presume it is because the shoreline groundwater may impact surface water. Please clarify.	**Response to Additional Comment 16.** Clarification has been added that surface water ARARs are included because shoreline groundwater is in contact with surface water, and groundwater generally flows toward Seaplane Lagoon. The following sentence has been added after the third sentence in Section A2.1.2: "Surface water ARARs were evaluated because shoreline groundwater is in contact with Seaplane Lagoon, and groundwater generally flows toward the surface water at IR Site 27."

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ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
Additional Comment 17. Table A2-2, page 4. It is unclear why water quality standards and effluent limitations are discussed. Is it anticipated that there will be a discharge to Seaplane Lagoon? Alternatively, does the Navy consider these requirements to be potential ARARs triggered by migration of contaminated groundwater from the shoreline area to Seaplane Lagoon?	**Response to Additional Comment 17.** Clarification has been added to the discussion indicating that the groundwater at IR Site 27 generally flows toward the surface water and that these requirements were identified for the potential discharge of groundwater to surface water. No point discharge to Seaplane Lagoon is being contemplated. Please see the response to Additional Comment 16.
Additional Comment 18. Table A2-3, page 1. In the discussion of State MCLs, several are identified in the "Comments" column as potentially relevant and appropriate, but the "ARAR Determination" column indicates that they are not an ARAR. This needs to be changed. EPA agrees that the State MCLs are relevant and appropriate for the inland groundwater.	**Response to Additional Comment 18.** Comment noted. The typographical errors have been corrected. The mismatched determinations have been revised. The more stringent MCLs have been identified as relevant and appropriate for the inland groundwater.
Additional Comment 19. Table A2-3, page 1. EPA does not consider the sections of the State Water Code to be ARARs, as they are authorizing provisions for the water boards and do not impose requirements that would be applicable or relevant and appropriate to the Navy's CERCLA action. If there are certain requirements established pursuant to these authorities that may be ARARs, e.g. water quality objectives, those requirements, and not the authorizing provisions, should be cited.	**Response to Additional Comment 19.** The EPA's statement on the State Water Code has been added to the discussion in Section A2.2.1.2 and is referenced in Table A2-3. The Navy has identified the Water Code sections in the table as enabling legislation only. The ARARs determination will be revised to indicate this position. The comments column has been revised to include a reference to the established requirements pursuant to the State Water Code in Table A2-3.
Additional Comment 20. Table A2-3, page 2, Basin Plan. Are beneficial uses other than MUN for groundwater considered to be potential ARARs for the shoreline groundwater?	**Response to Additional Comment 20.** Section A2.2.1.2 describes the groundwater beneficial uses for the site as MUN, AGR, IND and PROC. Other beneficial uses of shoreline groundwater are therefore considered in this FS Report.

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ADDITIONAL COMMENTS	RESPONSE TO ADDITIONAL COMMENTS
Additional Comment 21. Table A2-3, page 3, Resolution 92-49. Does the Navy consider section G to be an ARAR?	**Response to Additional Comment 21.** The Navy has identified Section G as a source of substantive requirements; however, Section G was determined not to be more stringent than federal ARARs and therefore is not considered a potential ARAR.
Additional Comment 22. Table A2-3, page 3, discussion of the Toxic Standards SIP. Do any of the remedial alternatives contemplate discharges into Seaplane Lagoon or San Francisco Bay?	**Response to Additional Comment 22.** Alternatives do not contemplate discharges to Seaplane Lagoon or San Francisco Bay. These standards are included in the ARARs analysis because shoreline groundwater may be migrating toward Seaplane Lagoon. See response to Additional Comment 17.
Additional Comment 23. Table A2-3, page 4, Resolution 92-49. It is not necessary to include this requirement twice.	**Response to Additional Comment 23.** The second entry of Resolution 92-49 has been deleted from Table A2-3 on page 4.
Additional Comment 24. Table A4-1, page 3, staging pile regulations. These regulations have been incorporated in California regulations at 22 CCR 66264.552(f).	**Response to Additional Comment 24.** Cal. Code Regs. tit. 22, § 66264.552(f) refers to the federal requirements at 40 C.F.R. § 264.554. Since it is not more stringent, Cal. Code Regs. tit. 22, § 66264.552(f) was not identified as a potential ARAR.
Additional Comment 25. Table A4-1, page 6. Discussion of the regulations on this page is confusing. Section 66264.90(c) seems to be an exception to or limit on 66264.117, so it seems strange that .117 is not included as an ARAR but .90(c) is.	**Response to Additional Comment 25.** Since no on-site source of the groundwater contamination has been identified at IR Site 27, the § 66264.117 requirement was determined not to be a potential ARAR. However, even though the § 66264.90(c) requirement references the § 66264.117 requirement, the substantive provision that requires 3 years of monitoring within compliance was determined to be relevant and appropriate for the alternatives that include proposed monitoring for natural attenuation.

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Comments from Mark Berscheid, DTSC-ESU, 1/17/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 1. The FSR addresses the risk pathway associated with the threat to groundwater only. The text of the FSR indicates the threat from the vapor intrusion pathway is negligible and does not need to be addressed. Based on the minimal depth of groundwater at this site, the ESU considers the vapor intrusion pathway to be a real threat to future site buildings under any residential land development scenarios. The ESU recommends a dedicated appendix or inclusion in existing appendices of more detailed information regarding the evaluation of the indoor vapor intrusion pathway as opposed to a singular sentence indicating there is no significant threat from this pathway.	**Response to General Comment 1.** Risk associated with the indoor air vapor intrusion pathway was evaluated in the RI Report as part of the baseline risk assessment. Because MCLs are identified as potential ARARs for inland groundwater, active treatment, MNA, and/or ICs will be implemented until VOC concentrations are reduced to a level at which MCLs are achieved. The Navy considers the use of MCLs as inland groundwater RAOs to be sufficiently protective for **all** exposure pathways at IR Site 27. For clarity, the following additional text from the final RI Report has been added to the third bullet in Section 2.6 (now the fourth bullet in Section 2.6.2) and replaces the last sentence in this bullet: "Based on human-health risk assessment (HHRA) results, inhalation of indoor air from this pathway represents a total cancer risk of 3×10^{-5} (U.S. EPA) or 4×10^{-6} (Cal/EPA), i.e., within the risk management range. U.S. EPA cancer risk based on modeling vapor migration to indoor air was calculated both by using concentrations of VOCs in groundwater and by using concentrations of VOCs in soil gas samples, and the results were compared and detailed in Appendix K of the RI Report (BEI 2005). The U. S. EPA residential indoor air cancer risks based on soil gas (3×10^{-5}) are slightly higher than those calculated using groundwater data (2×10^{-5}). Site-specific soil physical parameters collected as input for the Johnson and Ettinger model were found to be virtually the same as model default values. However, the model-calculated vapor permeability of 1.10×10^{-7} square centimeters (cm^2) is substantially more protective than the field-measured permeability of 3.3×10^{-9} cm^2. Because the indoor air concentration was higher (and therefore represents a greater risk) using the model default calculations, model default values were used rather than site-specific values."

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GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 2. The FSR indicates the monitored natural attenuation (MNA) treatment technology is an integral part of a number of treatment alternatives. The duration of the treatment alternatives containing the MNA option are based on the estimates of the success of multiple source area treatment technologies (i.e., ISB, ISCO, Dynamic Source Area Treatment). The duration of the MNA portion of the alternative following source area treatment is dependent on the concentration of COCs remaining after source treatment. In addition, the FSR has used a technology screening model, Biochlor, in combination with estimates of innovative and emerging treatment technology effectiveness to develop an overall alternative estimate of treatment duration and effectiveness, and cost. The ESU considers the use of a screening model such as Biochlor as a useful tool in the initial screening of treatment technologies. However, in order to support the type of analysis required in the detailed analysis of alternatives, the ESU recommends a more robust model such as Mod Flow in conjunction with additional site characterization information to provide an acceptable model.	**Response to General Comment 2.** IR Site 27 groundwater is currently being sampled and analyzed as part of the BGMP for MNA parameters as described in the response to U.S. EPA Specific Comment 29. A discussion of plume stability and MNA parameters has been added to Section 4.3.4.1. The revised text of Section 4.3.4.1, including two new figures (Figures 4-1 and 4-3) and one table (Table 4-4), is included herewith as Attachment 1*. Regarding use of the BIOCHLOR model, the Navy concurs that it is a screening tool. The Federal Remediation Technology Roundtable (FRTR) website described BIOCHLOR as a "natural attenuation screening model used to assess the feasibility of monitored natural attenuation (MNA) as a remedial approach for plumes of dissolved-phase chlorinated volatile organic compounds in groundwater" (FRTR 2004). MODFLOW add-ons also model natural attenuation, and would likely yield similar results to BIOCHLOR. There is, however, ample evidence in the data presented in the RI and BGMP reports that MNA is occurring. BIOCHLOR was used as the tool to estimate reaction rates in the MNA process for this FS Report. The Navy considers the BIOCHLOR model sufficient for FS purposes.

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GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 3. The ESU considers the proposal to use MNA as a requirement to obtain at a minimum the following site characterization information necessary to support the lines of evidence necessary for the choice of MNA as a viable treatment alternative. This information should be provided to the GSU for review prior to approval of a final FS. The following information can provide support to show the presence of the two lines of evidence necessary for the implementation of this remedy : a. The FSR indicates the plume is considered to be stable, the main line of evidence. The ESU recommends the FSR contain the information supporting this assumption in the FSR for GSU review. b. The FSR provides no physical data to support the presence of a conceptual model contributing to the success of MNA. A typical MNA alternative should contain physical data (i.e., Dissolved oxygen, MNA Parameters) that supports the presence of an anaerobic zone and sufficient electron donors (i.e., Nitrate, Sulfate). This data would provide the second necessary line of evidence.	**Response to General Comment 3.** Groundwater monitoring results for shoreline groundwater from 1995 to the present have shown stable and declining VOC concentrations. Groundwater monitoring results for inland groundwater from 2002 to the present also show stable and declining VOC concentrations. The presence of cis-1,2-DCE and vinyl chloride suggest that reductive dechlorination is occurring across the site. Data for IR Site 27 collected as part of the BGMP include MNA parameters. These data have been added to Section 4.3.4.1; the revised text of Section 4.3.4.1, along with two new figures and one table, is included herewith as Attachment 1*.

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GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 4. The ESU considers the inclusion of an MNA alternative as a requirement to address the need for an associated contingency plan. Every MNA alternative is required to contain a contingency plan. This is especially important at this site due to the uncertainties associated with the MNA alternatives. The MNA alternative is required to contain provisions for a sentinel well and a compliance well. The sentinel well, by way of monitoring results, will determine that the plume was not stable and indicate levels of contamination above target levels have reached this point. The compliance well can then be used to execute the contingency plan to contain the plume such that it can not migrate beyond this point and extracted groundwater can be adequately treated. The ESU does not see a cost for additional wells in the MNA alternatives cost analysis. Therefore , it must assume that the cost for well installation and subsequent analytical costs are not included in the detailed analysis of alternatives. The ESU considers the level of uncertainty regarding the effectiveness and duration of the present alternatives containing MNA as supportive of a treatment alternative that is not dependent on the implementation of MNA. Failure to resolve the above issues would appear to support the choice of Alternative 6B, sitewide ISCO treatment and groundwater confirmation sampling, as the recommended treatment alternative. The inclusion of the type of data discussed above or the execution of site specific treatability studies is recommended by ESU to provide the information necessary to support the treatment technologies recommended by the FSR	**Response to General Comment 4.** Uncertainties associated with MNA alternatives have been addressed in the response to General Comment 2 above. The Navy is not aware of a requirement for a contingency plan, nor is the Navy aware of a requirement for a sentinel well and a compliance well. The details of an MNA program (if an alternative is selected that involves MNA) would be developed during the remedial design stage. The assumed duration of MNA is based on conservative modeling assumptions; therefore, the actual time required to achieve MCLs is likely to be shorter. Additional MNA data are being collected as part of the BGMP. These additional data will be available for decision makers during the proposed plan stage.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 1. The FSR indicates that vertical migration of contamination is prevented by the presence of a difference in density between underlying saltwater and contaminated groundwater. The ESU recommends the submission for review by GSU of relative information assessing the site wide presence of this layer to support this assumption.	**Response to Specific Comment 1.** The saline water interface depicted in Figure 2-16 of the draft FS Report is described in the beneficial use report (TtEMI 2000) and the final RI Report (BEI 2005). The Navy may install additional wells, as described in the response to U.S. EPA Specific Comment 37, if these are determined to be needed. These new wells could be used to better assess potential VOC migration to deeper groundwater and the thickness and depth of the saline water interface. The following additional information about the saline water interface has been added after the second sentence in the seventh paragraph in Section 2.5.3.3: "The presence of a saline layer underlying Alameda Point was documented by the presentation of TDS data collected from wells throughout Alameda Point included in the Determination of the Beneficial Uses of Groundwater study conducted in 2000 (TtEMI 2000b)."
Specific Comment 2. The ESU concurs with the use of the RACER cost estimating system and its application to this project. The ESU also concurs with the assumptions made and the discount rate used to evaluate the cost of alternatives.	**Response to Specific Comment 2.** Comment noted. No response required.

	Note: * the contents of this attachment have been incorporated into the draft final Feasibility Study Report, and are therefore not reproduced here **References:** Bechtel Environmental, Inc. 2005. Draft Final Remedial Investigation Report, IR Site 27, Dock Zone, Alameda Point, Alameda, California. July. BEI. *See* Bechtel Environmental, Inc. Federal Remediation Technology Roundtable. 2004. At www.frtr.gov/decisionsupport/DST_tools/BIOCLOR.htm. FRTR. *See* Federal Remediation Technology Roundtable. Tetra Tech EM Inc. 2000. Determination of the Beneficial Uses of Groundwater. Prepared for the United States Department of the Navy, Southwest Division Naval Facilities Engineering Command, San Diego, California. July 13. TtEMI. See Tetra Tech EM Inc.

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Comments from Michelle Dalrymple, DTSC-GSU, 1/20/2006

GENERAL COMMENTS AND RECOMMENDATIONS	RESPONSE TO GENERAL COMMENTS AND RECOMMENDATIONS
General Comment A. The alternatives presented in the Draft FS do not propose the installation of additional monitoring wells or sampling locations to monitor the effectiveness of the remedial alternatives or post-remediation contaminant migration. It is the opinion of GSU that additional monitoring locations are necessary. For example, there are currently no monitoring wells in the vicinity of boring 27B22 where the highest cis-I ,2-dichloroethylene (cis-1,2-DCE) concentrations were found in groundwater. A monitoring well is needed in this area to verify and monitor concentration trends in the vicinity of the cis-1,2-DCE plume center. In addition, it is the opinion of GSU that additional monitoring wells are needed directly downgradient from the VOC plume centers that originate at Building 168 and Ferry Point Road to provide groundwater monitoring data to evaluate the long-term effectiveness of the remedial alternatives. Recommendation GSU requests that the Navy evaluate the monitoring well network at IR Site 27 to determine where additional monitoring wells are necessary to monitor the selected remedy. GSU requests that a monitoring well is installed in the cis-1,2-DCE plume center west of Building 168, and that a transect of monitoring wells is installed downgradient from the plume centers originating at Building 168 and Ferry Point Road.	**Response to General Comment A.** The elevated cis-1,2-DCE concentration (230 µg/L) at boring 27B22 is not evidence of a separate cis-1,2-DCE plume. Rather, the Navy believes that it is evidence that reductive dechlorination of VOCs in this area has not yet progressed to vinyl chloride. When compared in molar terms, the highest mass of chlorinated VOCs in the Building 168 plume occurs in samples from boring 27B29. To better assess VOC distribution at IR Site 27, a new figure (Figure 2-16) depicting total mass of VOCs in micromoles per liter has been added to Section 2. Figure 2-16 is included herewith as Attachment 2*. The following paragraph has been added to Section 2.5.3.3 after the third paragraph: "Figure 2-16 shows the total mass of VOCs in micromoles per liter in groundwater at IR Site 27. The figure illustrates that molar concentrations of VOCs were highest in the vicinity of boring 27B29. Although the concentration of cis-1,2-DCE in µg/L at boring 27B22 was higher than at boring 27B29, the molar mass results indicate that reductive dechlorination in the vicinity of boring 27B22 has not yet progressed to vinyl chloride." Additional monitoring wells may be installed during the remedial design phase, if determined to be needed.

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GENERAL COMMENTS AND RECOMMENDATIONS	RESPONSE TO GENERAL COMMENTS AND RECOMMENDATIONS
General Comment B. The proposed alternatives target a 10-foot thick treatment zone. The 10-foot thick treatment zone targeted for remediation may be insufficient. The vertical profile for selected chlorinated VOCs in groundwater illustrated on Figure 2-16 shows the vertical extent of contamination at levels above 5 micrograms per liter (pg/L) extends to a depth greater than 10 feet below the water table. In addition, as noted in GSU's comments on the Draft Final RI Report for IR Site 27, sufficient data have not been obtained to delineate the vertical extent of VOCs in groundwater at IR Site 27 (see Specific Comment 7). **Recommendation** GSU requests that the Navy clarify the basis for the selected 10-foot interval targeted for remediation. Depth-discrete groundwater sampling from a deeper interval within the aquifer to verify the absence of groundwater contamination directly beneath the identified plume centers should also be included (see Specific Comment 7).	**Response to General Comment B.** The assumed 10-foot-thick treatment zone for Alternatives 4A, 6A and 6B is based on groundwater analytical results from monitoring wells and discrete sampling at depths of 10 and 20 feet bgs. The assumed 10-foot treatment zone extends from the top of the water table at 6 feet bgs to 16 feet bgs. Depth-discrete groundwater sampling results from 20 feet bgs indicated that VOC impacts do not extend beyond the depth of shallow groundwater. The assumed 10-foot treatment interval assumption would be reevaluated during the remedial design stage.
General Comment C. Four of the remedial alternatives retained for the detailed analysis include MNA as a component of the remedy. For each of these alternatives, BICHLOR was used to evaluate the MNA component. BIOCHLOR is a simplistic two dimensional screening tool and should not be used to determine the possible success of natural attenuation at IR Site 27. If MNA is to be considered a viable alternative, it must be demonstrated to be potentially successful with appropriate site-specific data and analyses. **Recommendation** Additional data collection and analyses should be performed pursuant to guidance specified in Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater (EPA/600/R-981-128) dated September 1998.	**Response to General Comment C.** The Navy has been conducting groundwater monitoring at IR Site 27 for over a decade. This monitoring, conducted under the BGMP, has included testing for MNA parameters since 2002. These MNA parameters include nitrate, nitrite, sulfate, sulfide, dissolved oxygen, oxidation-reduction potential, dissolved gases (e.g., ethane and ethene) and VOCs, consistent with the U.S. EPA technical protocol (U.S. EPA 1998). A discussion of MNA data has been added to Section 4.3.4.1, included herewith as Attachment 1*, and to Section 2.6, as described in the response to Specific Comment 8. The BIOCHLOR model was used to predict the end point of MNA for the purpose of comparing alternatives. Continued monitoring and data analysis under the BGMP will document the effectiveness of MNA.

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GENERAL COMMENTS AND RECOMMENDATIONS	RESPONSE TO GENERAL COMMENTS AND RECOMMENDATIONS
General Comment D. The comparative evaluation presented in Section 7 should be expanded to justify the relative scoring determinations of "high," "medium," and "low. " GSU was unable to fully agree with the relative scorings based on the limited discussions presented. **Recommendation** GSU requests further elaboration of the advantages and disadvantages and key trade-offs of each alternative so that the reviewer can fully understand the basis for the relative scoring with respect to each of the NCP criteria (see Specific Comments 11, 12, and 13).	**Response to General Comment D.** Alternative 2 has been screened out in Section 5, and, therefore, was not carried forward to Sections 6 and 7, as explained in the response to U.S. EPA General Comment 2. A more detailed comparative analysis of alternatives may be conducted during the proposed plan stage. Please refer to the responses to Specific Comments 11, 12 and 13.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 1. Executive Summary. It is stated that the "chlorinated VOC plume" at IR Site 27 is depicted on Figure ES-3. However, Figure ES-3 shows only the vinyl chloride plume. The cis-1,2-DCE plume has a different configuration and is not represented on the figure. GSU suggests that a total VOC map is used to illustrate the lateral extent of chlorinated hydrocarbons in groundwater at IR Site 27, or that an overlay of the cis-1,2-DCE isoconcentration contours are added to Figure ES-3 (see Specific Comment 4).	**Response to Specific Comment 1.** Comment noted. A total VOC map (Figure 2-16) showing the mass of VOCs in micromoles per liter has been added, and is included herewith as Attachment 2*. Please refer to the response to General Comment A for further information regarding the presence of cis-1,2-DCE.
Specific Comment 2. Executive Summary. GSU requests that data gaps are discussed in the Executive Summary.	**Response to Specific Comment 2.** The following paragraph has been added to page ES-2 following the last paragraph under the Site Background heading: "Due to the expansion of the IR Site 27 boundaries to encompass the VOC plume, a washdown area (WD-166 and related oil/water separators) and Building 555 (an electrical substation) were included within the IR Site 27 boundaries. The RI Report identified data gaps associated with testing groundwater at the washdown area and with testing for PCBs in soil adjacent to Building 555. These data gaps are to be addressed during the remedial design phase."
Specific Comment 3. Section 2.5.3 - Analytical Results from Groundwater Samples. Several references to Alameda Point background concentrations for groundwater have been made in this section. However, it was decided in the Base Closure Team (BCT) meeting on October 18, 2005 that there are no Alameda Point background values established for groundwater. GSU requests that references to Alameda Point background concentrations for groundwater are removed from this section and elsewhere in the document.	**Response to Specific Comment 3.** The Navy acknowledges that the DTSC is conducting a review of the background data set; however, the Navy does not believe the conclusions of the RI Report should be affected by DTSC's review. At IR Site 27, arsenic is the only inorganic constituent that can be considered a risk driver in an exposure scenario based on domestic use of groundwater. Arsenic has been included as a COC in Table 3-1, with an RAO of 10 μg/L (based on the federal MCL). Please refer to the response to DTSC-OMF and HERD General Comment 2 for additional information regarding comparison to CTR criteria.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 4. Section 2.5.3.3 - Chlorinated Volatile Organic Compound Plume. GSU questions why only the vinyl chloride isoconcentration contours are shown to represent the horizontal extent of the chlorinated VOC plumes. Cis-1,2-DCE was also found at elevated concentrations in the area west of Building 168 and in the vicinity of Ferry Point Road. GSU requests that an overlay of the cis-1,2- DCE isoconcentration contours are included on Figure 2-1 5, or that a total VOC map is used to provide a more complete representation of the contamination present in the shallow groundwater at IR Site 27.	**Response to Specific Comment 4.** A new figure (Figure 2-16) has been added to the FS Report, and is included herewith as Attachment 2*. This figure depicts the total mass of VOCs in micromoles per liter, as described in the responses to General Comment A and Specific Comment 1.
Specific Comment 5. Section 2.5.3.3 - Chlorinated Volatile Organic Compound Plume. GSU understands that chlorinated hydrocarbon concentrations exceeding approximately 1 percent of the aqueous solubility may indicate the presence of a dense non-aqueous phase liquid (DNAPL). However, standard industry practice does not use the absence of concentrations greater than 1 percent of the aqueous solubility as evidence that a DNAPL is not present at a site. DNAPL may still be present in an area or interval that is not represented by the sampling network. GSU requests that the argument for the absence of DNAPL based on aqueous concentrations below 1 percent of the solubility is removed from the Draft Final FS.	**Response to Specific Comment 5.** Comment noted. The presence of a DNAPL is rarely confirmed, except in the cases where the DNAPL is physically observed during remedial investigations or monitoring well sampling. Rather, evidence (e.g., soil gas concentrations, comparison of groundwater concentrations to effective solubilities of the original solvent mixture, and contaminant distribution) is considered and the potential for the presence of DNAPL is evaluated. At IR Site 27, the Navy's position is that DNAPL is unlikely to be present, based on groundwater and soil gas VOC concentrations, contaminant distribution, and the chemical properties of DNAPLs. For clarification, however, the last sentence in the third paragraph of Section 2.5.3.3 has been deleted.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 6. Section 2.5.3.3 - Chlorinated Volatile Organic Compound Plume. The statement made regarding the reductions of VOC concentrations in shoreline wells in 2004 (see first sentence of second full paragraph on page 2-1 6) is unclear. Please clarify this statement and explain its significance.	**Response to Specific Comment 6.** The following text has replaced the first sentence in the fifth paragraph of Section 2.5.3.3: "VOC concentrations in shoreline wells have decreased significantly since 1994. Decreases in TCE and cis-1,2-DCE were accompanied by corresponding increases in vinyl chloride concentration. Based on the spring 2005 monitoring results, concentrations of vinyl chloride have now attenuated to nondetectable levels (ITSI 2005). These observations suggest that the natural attenuation process is at or near completion in the shoreline groundwater."
Specific Comment 7. Section 2.5.3.3 - Chlorinated Volatile Organic Compound Plume. GSU disagrees that the data obtained during the RI have demonstrated that the vertical extent of contamination above MCLs is 20 feet below ground surface (bgs). In the plume centers, no depth-discrete groundwater data was obtained below 10 feet bgs. In addition, lithologic data does not support the concept of limited vertical migration (i.e. there is no low permeability layer), and the freshwater/saline water interface argument is not supported with sufficient sites pecific data. Furthermore, at IR Site 9 located immediately southeast of IR Site 27, concentrations of VOCs were found to be relatively low at a depth of 10 to 15 feet bgs. However, concentrations were found to be an order-of-magnitude greater at 30 feet bgs. In fact, concentrations of VOCs at 45 feet bgs are still higher than those at 10 to 15 feet bgs, and are two orders-of-magnitude greater than the MCL. As stated in GSU's comments on the Draft Final RI Report, GSU requests that the vertical extent of VOCs in groundwater is considered a data gap at IR Site 27 and is verified during the remedial design phase. GSU requests that depth-discrete groundwater data are collected directly beneath the identified plume centers.	**Response to Specific Comment 7.** The plume center for the Building 168 plume is believed to be in the vicinity of boring 27B29, near the location of monitoring well 27MW06. Depth-discrete sampling of the deeper groundwater (to approximately 20 feet bgs) was conducted at several locations in the vicinity of that boring (upgradient, crossgradient, and downgradient). VOC results for deeper groundwater samples were below laboratory reporting limits or at least two orders of magnitude below the shallower results. Additional monitoring wells may be installed during the remedial design phase, if they are determined to be needed.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 8. Section 2.6 - Fate and Transport of Contaminants. The following pertains to the fate and transport discussions: • **Please include additional discussion of the fate of chemicals of interest, primarily cis-1,2-DCE and vinyl chloride.** • **The discussion of fate and transport should include vertical transport as well as horizontal transport of chemicals of interest.** • GSU questions whether the railroad spurs are unpaved. If so, possible infiltration of precipitation along these lines could occur and locally affect groundwater flow and contaminant transport. **Please clarify whether this may be occurring at IR Site 27.**	**Response to Specific Comment 8.** Section 2.6 is a summary of Section 5 of the final RI Report (BEI 2005). The following additional text from the final RI Report has been added to Section 2.6 (as 2.6.1) following the second paragraph and creating a 2.6.2 subheading before the third paragraph: **"2.6.1 Fate of Organic Compounds** "The persistence or mobility of organic compounds is governed by their physicochemical properties, transformation mechanisms and the properties of the soil that act on them. "Chlorinated VOCs (cis-1,2-DCE; trans-1,2-DCE; TCE; and vinyl chloride) are the primary chemical group impacting groundwater at IR Site 27; chlorinated VOCs are simple organic compounds bonded with chlorine. In the subsurface, depending on conditions (the presence of nutrients, microorganisms, a reducing environment, etc.), chlorinated VOCs typically undergo reductive dechlorination, a biological process that breaks down chlorinated ethenes in groundwater. "The chlorinated ethenes PCE and TCE degrade in reducing environments to form 1,2-DCE or 1,1-DCE (the most common intermediate is cis-1,2-DCE), and vinyl chloride. The presence of vinyl chloride, cis-1,2-DCE and trans-1,2-DCE in groundwater at IR Site 27 indicates that reductive dechlorination of PCE and TCE is occurring. Continued dechlorination of 1,2-DCE may initially cause vinyl chloride concentrations in groundwater to increase over time. However, vinyl chloride can be rapidly degraded (oxidized) under aerobic (in the presence of oxygen) conditions to ethene, carbon dioxide, water, and chlorine, with ethene further degraded to ethane (U.S. EPA 1998). Additionally, in an anaerobic (in the absence of oxygen) environment, microorganisms known as dehalococcoides and several similar organisms can completely dechlorinate TCE, DCE, and vinyl chloride (Major 2002). At least one

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 8 (continued).	**Response to Specific Comment 8 (continued).** strain of these microorganisms is present at Alameda Point (Koenigsberg et al. 2002, 2003; Richardson et al. 2002). "Monitoring of dissolved gases under the basewide groundwater monitoring program confirms the presence of ethene and ethane, which are products of the dechlorination of vinyl chloride in groundwater at IR Site 27; this indicates that the breakdown of vinyl chloride is occurring. **"2.6.2 Transport Mechanisms** "A summary of the possible...[existing text follows]." The following bullet has been inserted after the first bullet in newly numbered Section 2.6.2: • "Vertical transport of chlorinated VOCs is not considered a significant transport mechanism, based on VOC data and the approximate location of the saline interface." To address the question of railroad spurs as a potential infiltration pathway, the following text has been added to the penultimate bullet in Section 2.6.2: "Most of IR Site 27 is paved, including the locations of railroad spurs."
Specific Comment 9. Section 4.3.4.1 – Lines of Evidence. It is stated on page 4-7, at the end of the first paragraph that the model simulation results indicate that natural attenuation is occurring. However, the model is designed to simulate decay. The model cannot be used to indicate whether natural attenuation is occurring because the decay rate is a user-defined term. **Please correct this statement.**	**Response to Specific Comment 9.** Comment noted. The last sentence under the Modeling heading in Section 4.3.4.1 has been revised to state the following: "The model simulation results presented in Appendix B are used in this FS Report to predict the rates of decay and the duration for MNA that are required to reach RAOs." Please see Attachment 1* for the new text of Section 4.3.4.1.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 10. Section 5.1.8 – Alternative 6B – Sitewide ISCO Treatment and Groundwater Confirmation Sampling. One year of post-remediation monitoring may not be sufficient to monitor the success of this alternative. Average linear groundwater flow velocities published in the Draft Final RI Report are on the order of 0.005 to 0.075 feet per day at IR Site 27. **GSU requests that the duration of post-remediation monitoring is supported with additional evaluation using site- and chemical-specific information. This evaluation should include the possible diffusion of postremediation contaminants from soils in the plume cores, and the length of time that would be expected for those contaminants to reach downgradient monitoring locations**	**Response to Specific Comment 10.** For FS purposes, one additional groundwater monitoring event has been added to Alternative 6B at the end of year 3, as described in the response to U.S. EPA Specific Comment 41. The post-remedial monitoring program will be developed during the remedial design phase. Additional monitoring wells may be installed if determined to be needed.
Specific Comment 11. Section 7.3 – Long-Term Effectiveness and Permanence. It is stated that Alternatives 2 and 3 received a ranking of "medium" because the assumed 70-year duration would require implementation of institutional controls (ICs) for a longer time-period than durations assumed for 4A, 6A, and 7. The assumed duration is also much longer than that assumed for Alternative 6B. **Please add Alternative 6B to this statement.**	**Response to Specific Comment 11.** Alternative 2 has been eliminated from further consideration in Section 5 on the basis of low effectiveness, because no means would be provided to assess whether RAOs were achieved. The following sentence has been inserted after the first sentence in the second paragraph in Section 7.3: "The assumed duration for Alternative 3 is also considerably longer than that assumed for Alternative 6B."
Specific Comment 12. Section 7.3 – Long-Term Effectiveness and Permanence. It is unclear why Alternatives 4A, 6A, and 6B all received "high" rankings for long-term effectiveness and permanence when the assumed 60-year and 45-year durations for Alternatives 4A and 6A, respectively, would require implementation of ICs for a longer time-period than the duration assumed for Alternative 6B (2 years). **Please clarify.**	**Response to Specific Comment 12.** Alternatives 4A, 6A and 6B each involve varying degrees of *in situ* groundwater treatment to reduce VOC concentrations in groundwater. These treatments are assumed to reduce VOC concentrations in a short period of time. While Alternatives 4A and 6A are assumed to require ICs and MNA to reach RAOs, the effectiveness of the treatment is assumed to be permanent and effective.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 13. Section 7.5 – Short-Term Effectiveness. GSU questions why Alternatives 2 (ICs) and 3 (MNA) received a "high" score for short-term effectiveness while Alternative 4A, 6A, and 6B received a "medium" score. One criterion that is evaluated as part of short-tem effectiveness is the time until RAOs are achieved. Alternative 6B is expected to require only two years to achieve RAOs, and the other alternatives are expected to require between 45 and 70 years. **GSU requests clarification regarding the criteria used and relative scores applied to the various alternatives with respect to short-term effectiveness.**	**Response to Specific Comment 13.** Alternative 2 has been screened out in Section 5, and, therefore, is not discussed in Sections 6 and 7 of the draft final FS Report, as described in the response to U.S. EPA General Comment 2. The ranking of alternatives in accordance with the short-term effectiveness criterion is also described in the responses to U.S. EPA General Comment 3 and U.S. EPA Specific Comment 30.

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	Note: * the contents of this attachment have been incorporated into the draft final Feasibility Study Report, and are therefore not reproduced here **References:** Bechtel Environmental, Inc. 2005. Draft Final Remedial Investigation Report, IR Site 27, Dock Zone, Alameda Point, Alameda, California. July. BEI. *See* Bechtel Environmental, Inc. Innovative Technical Solutions, Inc. 2005. Spring 2005 Alameda Basewide Groundwater Monitoring Report. Alameda Point, Alameda, California. July. ITSI. *See* Innovative Technical Solutions, Inc. Koenigsberg, S.S., C.A. Sandefur, and K.A. Lapus, and G. Pasrich. 2002. Facilitated desorption and incomplete dechlorination: Observations from 350 applications of HRC (poster presentation). *Proceedings,* Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds. Monterey, California. May 20–23. Koenigsberg, S.S., J.C. Bensch, and C.E. Lombardi. 2003. Implications for Bioaugmentation at a RABITT Protocol Site Revisited. *Proceedings,* Seventh International In Situ and On-Site Bioremediation Symposium, Orlando, Florida. June 2–5. Major, D. 2002. To Bioaugment or Not to Bioaugment, That is the Question. GeoSyntec Consultants. Richardson, R.E., V.K. Bhupathiraju, D.L. Song, T.A. Goulet, and L. Alvarez-Cohen. 2002. Phylogenetic characterization of microbial communities that reductively dechlorinate TCE based upon a combination of molecular techniques. *Environmental Science & Technology. 36*: 2652–2662. U.S. EPA. 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-981-128. September.

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Comments from Marcia Liao, DTSC-OMF and HERD, 1/23/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 1. Arsenic in some inland well samples exceeds the U.S. EPA drinking water Maximum Contaminant Level (MCL) of 10 pg/L, but not the California Department of Health Services (DHS) drinking water MCL of 50 pg/L (Section 2.5.3, page 2-14). However, the California DHS drinking water MCL for arsenic is under review. As part of that process, the California EPA (CalEPA) Office of Environmental Health Hazard Assessment (OEHHA) has developed a Public Health Goal (PHG) for arsenic in water of 0.004 pg/L (CalEPA, 2004) (http://www.oehha.ca.gov/water/phg/pdf/asfinal.pdf). The following summary from the OEHHA document outlines the relationship of the PHG to the California MCL being developed: The U. S. EPA 's final rule on arsenic in drinking water (U. S. EPA, 2001) developed an MCLG of zero. The MCLG is the functional equivalent of the California public health goal (PHG) for drinking water. The U.S. EPA also established a national primary drinking water regulation or MCL for arsenic of 10 ppb. U. S. EPA's upper bound (90th percentile) estimates of lifetime cancer risk at 10 ppb ranged up to 6.1 in 10,000. This federal regulation does not become fully effective until 2006. In California the MCL for arsenic will be determined by the Department of Health Services to be as close to the PHG as possible considering other factors such as cost and analytical feasibility. All of these assessments recognize the relatively high cancer risks associated with chronic exposure to inorganic arsenic. The current assessment refines and extends our earlier arsenic risk assessment (OEHHA, 1992a). OEHHA has developed a public health goal (PHG) of 0.004 pg/L (4 ppt) for arsenic in drinking water based on the mortality of arsenic-induced lung and urinary bladder cancers observed in epidemiological studies of populations in Taiwan, Chile, and Argentina	**Response to General Comment 1.** Comment noted. Arsenic concentrations (maximum 23.9 µg/L) in samples from one inland monitoring well (well 15-MW3) exceed the MCL of 10 µg/L. Arsenic has been added as a COC for inland groundwater in Table 3-1 with an RAO of 10 µg/L. Arsenic concentrations in shoreline groundwater do not exceed surface water comparison criteria, so arsenic is not considered a COC in the shoreline portion of IR Site 27.

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GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 1 (continued). Given the equivalence of the U.S. EPA MCLG to the OEHHA PHG and the current revision process of the California DHS MCL for arsenic, the protective action is to consider the U.S. EPA MCL of 10 µg/L as the appropriate Remedial Action Goal (RAO) rather than the current California DHS MCL of 50 pg/L.	**Response to General Comment 1 (continued).**
General Comment 2. Groundwater concentrations of copper, lead, mercury, nickel and zinc were identified as exceeding the California Toxics Rule (CTR) criteria, but discounted as comparable to NASA (Alameda Point) 'background concentrations' (Section 2.5.3, page 2-14). As a point of historical accuracy, HERD never reviewed nor agreed to any groundwater 'ambient' concentrations for inorganic elements. HERD only recently received, as part of a Resource Conservation and Recovery Act (RCRA) facility review, an electronic copy of the proposed groundwater ambient data set. Preliminary analysis of this data set indicates that lead and nickel have obvious high outliers which must be removed from any ambient data set. The mercury data set, with 198 total samples, contains only 2 detected concentrations, meaning that nearly 99 percent of the values represent laboratory detection limits rather than mercury concentrations in the environment. Ambient groundwater concentrations should not be used as a screening criterion for IR Site 27 pending completion of HERD review and resolution with the Navy.	**Response to General Comment 2.** The Navy acknowledges that DTSC is conducting a review of the groundwater background data set. The Navy does not anticipate that this review will result in any changes in which chemicals were carried forward from the RI Report to the FS Report. A review of data for metals with CTR criteria that were found to be distributed statistically equivalent to the background data set (i.e., copper, lead , mercury, nickel, and zinc) shows that the number of samples with concentrations exceeding the CTR chronic toxicity criteria is limited (regardless of the background comparison). The table below presents the total number of groundwater samples and the limited number of samples with metals concentrations exceeding CTR criteria.

Analyte	Samples Analyzed	Number Exceeding CTR CCC Criterion
Copper	83	11
Lead	83	3
Mercury	78	5
Nickel	83	12
Zinc	83	1

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GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 3. The ambient groundwater data set should not be used for comparison of the groundwater concentration in shoreline wells (Section 2.5.3.1, pages 2-14 and 2-1 5) to groundwater ambient concentrations until HERD'S review of the groundwater ambient data set is completed. For example, preliminary analysis indicates that beryllium data set consists of 18 detected and estimated (J-qualified) concentrations, with a non-parametric distribution, out of 194 'values' and the selenium groundwater ambient data set contains a single estimated (J-qualified) value out of 193 'values'. For these reasons, and those cited in the preceding specific comment, comparisons to NASA 'background concentrations' should not be considered for most inorganic elements.	**Response to General Comment 3.** For the two metals cited in this comment, beryllium and selenium, concentrations reported in groundwater are less than the CTR criteria; therefore, comparison to background criteria was not necessary. Please see response to General Comment 2 for a discussion of metals with concentrations exceeding CTR criteria.
General Comment 4. The source of the release of Volatile Organic Compounds (VOCs) to IR Site 27 groundwater is unknown. The current conception is that the source could be either the historical activities in Building 168 or, less likely, migration of a slug of VOCs in groundwater from a release upgradient of IR Site 27 (Section 2.5.3.3, page 2-1 5). The Navy has deferred sampling and analysis in the vicinity of washdown area (Section 2.8, page 2-22) which might resolve the uncertainty regarding the source of VOCs. Remediation without clear and accepted designation of the release site would seem unwise.	**Response to General Comment 4.** There were no indications that the washdown area, which is located outside and crossgradient to the VOC plume, could be a source of the VOC plume. The Navy identified the washdown area as a data gap in the general characterization of the area encompassed by the expanded IR Site 27 boundaries, rather than as a data gap associated with characterization of the VOC plume (BEI 2005). Reference: Bechtel Environmental, Inc. 2005. Draft Final Remedial Investigation Report, IR Site 27, Dock Zone, Alameda Point, Alameda, California. July. BEI. *See* Bechtel Environmental, Inc.

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Comments from Marcia Liao, DTSC-OMF and HERD, 1/23/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 5. While unlikely to be risk drivers, the distribution of inorganic elements removed from the health assessment based on NASA 'background' concentrations should be evaluated in a well-by-well manner similar to that provided for arsenic.	**Response to General Comment 5.** Table 2-6 presents the human-health risk assessment calculation of total risk. No inorganic elements were removed from these calculations included in the RI Report. As stated in the RI Report, every chemical detected at least once was included in the risk assessment. With the exception of arsenic, the contribution of inorganic elements to the total risk is negligible (a total risk of less than 10^{-6} combined). Specifically, the total risk for ingestion of groundwater is 5×10^{-4}, of which arsenic represents 3×10^{-4} and vinyl chloride represents 2×10^{-4}. Because no other inorganic element is a risk driver and no other inorganic element was reported at a concentration exceeding an MCL, no well-by-well evaluation is necessary for other inorganic elements.
General Comment 6. The remedial action objectives (RAOs) apply at appropriate shoreline monitoring wells, not in the receiving water following initial dilution (Section 3.4, page 3-7). Please consult San Francisco Bay Regional Water Quality Control Board (RWQCB) for further direction on this issue.	**Response to General Comment 6.** CTR criteria are surface water ARARs; they apply to the surface water rather than to the monitoring wells. It has been determined that the shoreline groundwater at monitoring wells already meets the CTR criteria before entering the surface water. Although the Navy's position is that a mixing zone at the point of discharge to the surface water is appropriate for this scenario, a mixing zone is not necessary to demonstrate compliance with RAOs in shoreline groundwater. Please refer to the response to RWQCB Specific Comment 7.

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Comments from Judy Huang, RWQCB, 1/23/2006

GENERAL COMMENTS	RESPONSE TO GENERAL COMMENTS
General Comment 1. **Definition of Inland vs. Shoreline Groundwater:** It is unclear to staff exactly how the report proposed to delineate shoreline vs. inland groundwater. Please clarify.	**Response to General Comment 1.** For FS purposes, the delineation between shoreline groundwater and inland groundwater is the sheet pile bulkhead, as discussed in Section 2.4.6 of the draft Feasibility Study (FS) Report. The approximate location of the bulkhead is shown on Figure 2-1.

SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 1. **Page ES-3, Remedial Action Objectives, First Paragraph, Second Sentence:** This sentence stated, "RAOs for shoreline groundwater are based on California Toxics Rule criteria for human health (consumption of organisms)." First, in addition to the California Toxics Rule (CTR) criteria for human health, CTR salt-water criteria for the protection of aquatic life should also be applied. Second, due to the potential for inland groundwater to be discharged to Seaplane Lagoon through preferential pathways such as storm sewer gravel bedding, CTR criteria should also be applied to inland groundwater. Please revise the Draft FS.	**Response to Specific Comment 1.** The site-specific screening-level ecological risk assessment (ERA) for IR Site 27 conducted as part of the RI (BEI 2005) concluded that VOCs and metals in shoreline groundwater do not pose a risk to aquatic receptors, and that, therefore, no protective measures are warranted and no RAOs are necessary. Additional text has been added to Section 2.7.2 providing the basis for this conclusion; text has also been added to the Executive Summary on pages ES-2 and ES-3. Section 2.7.2 has been revised to clarify the low-to-negligible risk to aquatic life organisms in surface water adjacent to IR Site 27 and to indicate that there would be no need for aquatic life RAOs for surface water adjacent to IR Site 27. The following paragraphs have been inserted at the beginning of Section 2.7.2: "Chemicals of potential ecological concern (COPECs) for aquatic receptors at San Francisco Bay were identified using analytical data collected from groundwater monitoring wells, and included all chemicals that were reported at least once. As a conservative measure, concentrations of COPECs for aquatic receptors were estimated using

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 1 (continued).	**Response to Specific Comment 1 (continued).** maximum concentrations of COPECs in groundwater; these maximum concentrations were compared to California Toxics Rule (CTR) criteria continuing concentrations (CCCs). Therefore, the ERA provides a protective overestimate of the actual risk of adverse ecological effects at IR Site 27. "Based on sitewide groundwater concentrations, there is low-to-negligible potential ecological risk from reported COPECs for aquatic receptors, even if groundwater were to enter Seaplane Lagoon at the maximum reported concentrations. The ERA identified a potential for VOCs to exceed the CTR screening values for human-health consumption of organisms if aquatic life organisms were to consume chemicals in groundwater that reaches Seaplane Lagoon. The VOCs at IR Site 27 likely represent a low potential ecological risk due to low HQs, infrequent occurrence, concentrations below CTR criteria for human-health consumption of organisms in shoreline wells, and nonpersistence in aquatic environments. Therefore, the ERA concluded that, due to the low or negligible risk for aquatic life from reported COPECs, no further investigation or assessment of ecological risk for groundwater reaching surface water at IR Site 27 is recommended." Executive Summary, page ES-2, Site Background. The following sentence has been added to the end of the penultimate paragraph: "The ERA provides a protective overestimate of the actual risk of adverse ecological effects to aquatic life organisms in surface water adjacent to IR Site 27 because of the conservative nature of the assumptions used, i.e., maximum concentrations of chemicals in groundwater were compared to California Toxics Rule criteria continuing concentrations (CCCs)."

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 1 (continued).	**Response to Specific Comment 1 (continued).** Executive Summary, page ES-3, Remedial Action Objectives. The following sentence has been added to the end of the third paragraph. "No surface water RAOs for aquatic receptors are selected for IR Site 27 because of the lack of significant ecological risk to aquatic life organisms, as established by the ERA conducted at IR Site 27." As described in Section 1.3.4.5 of the RI Report (BEI 2005), previous investigations concluded that storm drain bedding materials at Alameda Point are not a preferred pathway for migration of contaminants (TtEMI 2002). Therefore, the discharge of inland groundwater through storm sewer bedding was not identified as a significant pathway in the RI Report. The Navy does not consider surface water CTR criteria to apply to inland groundwater. Section 3.4 has been revised to state that the RAOs selected for inland groundwater were the lowest of the federal MCL, the nonzero federal MCLG, or the state MCL. The last bullet in Section 3.4 has been deleted. For COPECs in shoreline groundwater that may discharge to Seaplane Lagoon, surface water CTR criteria for human-health consumption of organisms were used as RAOs. Because shoreline groundwater already meets these RAOs, accounting for a mixing zone or attenuation factors was not considered necessary.

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SPECIFIC COMMENTS	RESPONSE TO SPECIFIC COMMENTS
Specific Comment 2. **Page 3-2, Section 3.2 Potential Receptors and Exposure Pathways, Second Paragraph:** This paragraph stated that "ICs could be used to prevent installation of drinking water wells within the area of the IR site 27 groundwater plume to prohibit extraction of VOC impacted groundwater for domestic purposes until after remediation goals are achieved or the Navy and regulatory agencies agree that ICs are no longer required." In addition to preventing installation of drinking water wells to preclude human exposure to the contaminated groundwater, it should also be stated that the ICs minimize the potential migration of the contaminated groundwater to the deep aquifer. Please revise the Draft FS to reflect this fact.	**Response to Specific Comment 2.** The last sentence in the third paragraph in Section 3.2 has been revised to read as follows: "ICs could be used to prohibit installation of drinking water wells within the area of the IR Site 27 groundwater plume, extraction of VOC impacted groundwater for domestic purposes, and cross-connection between FWBZ and SWBZ groundwater until after remediation goals are achieved or the Navy and regulatory agencies agree that ICs are no longer required." The specific elements of the IC program would be developed during the remedial design stage.
Specific Comment 3. **Page 3-2, Section 3.2 Potential Receptors and Exposure Pathways, Last Paragraph:** This paragraph stated that "Potential ecological impacts of discharges to Seaplane Lagoon would be mitigated by VOC dilution and volatilization that would occur as groundwater seeps into and mixes with the surface water." The Basin Plan does not grant dilution credit for discharges such as those at Site 27 into Seaplane Lagoon without a site-specific technical demonstration. However, the Basin Plan would allow attenuation of groundwater in soil prior to the point of discharge. Please remove the dilution discussion or replace it with a discussion of attenuation factor.	**Response to Specific Comment 3.** The last three sentences in the penultimate paragraph in Section 3.2 of the draft FS Report have been deleted.

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Specific Comment 4. **Page 3-3, Section 3.2 Potential Receptors and Exposure Pathways, First Paragraph:** This paragraph stated "the nature of the potentially impacted surface water ecosystem could be significantly changed by local redevelopment in the coming years. Therefore, it would be highly speculative to predict any future adverse ecological effects based on current conditions." Staff disagrees with this statement. This statement directly contradicts the purpose of a CERCLA cleanup action. CERCLA specifically requires the responsible party to cleanup the site to protect future reuse, including ecological effects. Please revise the Draft FS.	**Response to Specific Comment 4.** The last two sentences of Section 3.2 have been deleted.
Specific Comment 5. **Page 3-5, Section 3.3.1.1 Groundwater Second Full Paragraph:** This paragraph stated that shoreline groundwater does not have to meet MCLs, but inland groundwater does. However, it is unclear to staff how shoreline and inland groundwater is defined. Please clarify.	**Response to Specific Comment 5.** Please refer to the response to General Comment 1.
Specific Comment 6. **Page 3-7, Section 3.4 Remedial Action Objectives for IR Site 27 Groundwater, Third Paragraph, Fourth Bullet:** This bullet stated the CTR criterion for protection of human health based on consumption of saltwater aquatic life (risk-based) is a Remedial Action Objective (RAO) for IR Site 27. CTR criterion for the protection of aquatic life should also be included as a Remedial Action Objective. Please revise the Draft FS.	**Response to Specific Comment 6.** Please refer to the response to Specific Comment 1.

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Specific Comment 7. **Page 3-7, Section 3.4 Remedial Action Objectives for IR Site 27 Groundwater, Last Paragraph:** This paragraph stated that "RAOs derived from numerical water quality criteria for priority pollutants promulgated in the CTR (40CFR §131.38) and implemented in the Enclosed Bays and Estuaries Plan (SWRCB 2000) as part of the Basin Plan apply in the receiving water (Seaplane Lagoon and San Francisco Bay), following initial dilution. A mixing zone above the physically identifiable point of discharge in the receiving water is assumed for the purposes of this FS Report." Section 1.4.2, of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) does allow the Water Board to grant dilution credits based on mixing zones. However, the SIP further states that "Dilution credits and mixing zones for incompletely-mixed discharges shall be considered by the RWQCB only after the discharger has completed an independent mixing zone study and demonstrated to the satisfaction of the RWQCB that a dilution credit is appropriate." In the absence of a Water Board approved mixing zone study, it is inappropriate for the Draft FS to assume a mixing zone exists. Please revise the Draft FS.	**Response to Specific Comment 7.** Typically, the discharge from groundwater to surface water is slow and allows for complete mixing. The concentrations of COCs (VOCs and arsenic) in groundwater, however, are already below the surface water ARARs (CTR criteria for human-health consumption of organisms). Although the Navy believes that the mixing zone is in compliance with substantive ARARs, the text will be deleted to remove the mixing zone assumption phrase because no attenuation factor is necessary in order to meet the CTR criteria for this site.
Specific Comment 8. **Page A2-1, Appendix A, Section A2.1.1.1 Groundwater ARARs Conclusions:** The proposed ARAR list is incomplete. The attached table has additional ARARs that should be included in the Draft FS. Please include the ARARs in the attached table and revise the relevant discussions in the Draft FS.	**Response to Specific Comment 8.** Comment noted. The potential ARARs listed in the table were included in the ARARs analysis in Appendix A. The table attached to the RWQCB comments has been expanded (as Table 1) to include a response column to address each of the listed requirements. Please see Table 1 for Navy responses to this list of potential ARARs.

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Specific Comment 9. **Page A2-3, Potential Federal ARARs:** 40 CFR Part 131, *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California*, promulgated by US EPA on May 18, 2000 (California Toxic Rule) is a Federal ARAR for Site 27. Please revise the Draft FS to include the CTR.	**Response to Specific Comment 9.** Table A2-2 includes 40 C.F.R. 131.38 as a potential surface water ARAR. The text of Table A2-2 has been revised to include a note indicating that the listed water quality standards are stated in the CTR. Reference to the CTR is also included in Sections A2.1.2 and A2.2.2.1 (both pertaining to surface water) in Appendix A of the FS Report.
Specific Comment 10. **Page A2-10, Comprehensive Water Quality Control Plan for San Francisco Bay Basin (Basin Plan):** This section stated that since Basin Plan allows for exceptions for MUN designation and that the shoreline groundwater beneath IR Site 27 meets the exemption criteria, the shoreline groundwater should not be considered as a drinking water source (page 2-5 of the Basin Plan). Staff disagrees with this assessment. In addition to allowing for MUN designation exceptions, page 2-6 of the Basin Plan further states that "in making any exceptions, the Regional Board will consider the criteria referenced in Regional Board Resolution No. 89-63, "Sources of Drinking Water." Section 4 of Resolution 89-63 titled Regional Board Authority to Amend Use Designation states "any body of water which has a current specific designation previously assigned to it by a Regional Board in Water Quality Control Plans may retain that designation at the Regional Board's discretion." Because Site 27 falls within a groundwater basin classified by the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report – Alameda and Contra Costa Counties, California,* (California Regional Water Quality Control Board, San Francisco Bay Region, June 1999) as a significant drinking water source, the shallow aquifer should be cleansed to Department of Health Services' maximum contaminant levels for drinking water. This is because the deeper aquifers underlying the shallow aquifer zone are of drinking water quality. The issue of contamination of the deeper aquifer via vertical conduits from the shallow zone and the fact that an approved well abandonment program has never been instituted requires this approach.	**Response to Specific Comment 10.** The substantive requirements of the Basin Plan that have been determined to be ARARs include the criteria that must be met for groundwater to be considered a potential source of drinking water. The site-specific technical analysis using the "Sources of Drinking Water" criteria set forth in SWRCB Res. 88-63 is provided in Section 2.4.6 and Section A2.2.1.1 of the FS Report. The shoreline groundwater does not meet these substantive criteria for consideration as a potential source of drinking water. The Regional Board's "discretion" regarding whether or not to grant an exception is not a substantive requirement, and therefore this element of the Basin Plan is not an ARAR. The RI data for groundwater samples beneath the known contamination at the site show no indication that VOCs from the shallow groundwater are migrating vertically.

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	References: Bechtel Environmental, Inc. 2005. Draft Final Remedial Investigation Report, IR Site 27, Dock Zone, Alameda Point, Alameda, California. July. BEI. *See* Bechtel Environmental, Inc. Tetra Tech EM Inc. 2002. Data Summary Report, Supplemental Remedial Investigation Data Gap Sampling for Operable Units 1 and 2, Alameda Point, Alameda, California. July 25. TtEMI. See Tetra Tech EM Inc.

Table 1 (for Response to RWQCB Specific Comment 8)
ARARs for Groundwater Remediation

#	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	RWQCB Comments	Navy Response
1	Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.)	California Water Code Section 13243	The RWQCB may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted.	Applicable	Applies to groundwater remedial action	Cal. Water Code §13243 is already included in Table A2-3 and Sections A2.1.1, A2.1.2, and A2.2.1.2 as enabling legislation, implemented through the beneficial uses, water quality objectives, waste discharge requirements, and promulgated policies of the Basin Plan.
2	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243)	Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin, RWQCB, SFB	Establishes water quality objectives, including narrative and numerical standards, that protect the beneficial uses and water quality objectives of surface and ground waters in the region. Describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. Alameda Point lies within the East Bay Plains Groundwater Basin. Existing and potential beneficial uses of this groundwater are: municipal and domestic supply, industrial process water supply, industrial service water supply, agricultural water supply, and freshwater replenishment to surface water.	Applicable	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated soils or waters or in-situ treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.	The Basin Plan has already been identified as a potentially applicable ARAR in Table A2-3, and Sections A2.1.1, A2.1.2, and A2.2.1.2.

Table 1 (continued)

#	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	RWQCB Comments	Navy Response
3	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13304, 13240, 13241, 13242, 13243)	RWQCB, SFB Basin Plan, "Implementation Plan, Groundwater Protection and Management, Cleanup of Polluted Sites."	Establishes and describes policy for investigation and remediation of contaminated sites. Also includes implementation actions for setting groundwater and soil cleanup standard.	Applicable	Cleanup standards for water should be equal to background concentrations unless such levels are technically and economically infeasible to achieve. In such cases, cleanup standards should not exceed applicable water quality objectives.	The Navy has determined that Cal. Code Regs. tit. 22, § 66264.94(a)(1) and (3), (c), (d) and (e) are potentially relevant and appropriate federal ARARs which have the same requirement for concentration limits to be set at background unless technologically or economically infeasible. Since the Basin Plan "Implementation Plan" is not more stringent, it is not a potential ARAR.
4	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243)	RWQCB, SFB Basin Plan, "Water Quality Objectives"	This policy defines water quality objectives and explains how the Regional Water Board applies numerical and narrative water quality objectives to ensure the reasonable protection of beneficial uses of water and how the Regional Water Board applies Resolution No. 68-16 to promote the maintenance of existing high-quality waters.	Applicable	Applies to groundwater remedial actions.	The Basin Plan water quality objectives and beneficial uses are included as potential ARARs in Section A2.2.1.2 and Table A2-3.

Table 1 (continued)

#	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	RWQCB Comments	Navy Response
5	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13263, 13304)	State Water Resources Control Board Resolution No. 68-16 ("Anti-degradation Policy").	Requires that high quality surface and ground waters be maintained to the maximum extent possible. Degradation of waters will be allowed (or allowed to remain) only if it is consistent with the maximum benefit to the people of the state, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in RWQCB and SWRCB policies. If degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state.	Applicable	Applies to discharges of waste to waters, including discharges to soil that may affect surface or ground waters. In-situ cleanup levels for contaminated ground waters must be set at background level, unless allowing continued degradation is consistent with the maximum benefit of the people of the state. If degradation of waters is allowed, or allowed to remain, the discharge must meet best practical treatment or control standards, and result in the highest water quality possible that is consistent with the maximum benefit to the people of the state. In no case may water quality objectives be exceeded.	The Navy and state positions on SWRCB Res. No. 68-16 are included in Section A2.2.1.2.
6	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240, 13260, 13263, 13267, 13300, 13304, 13307)	State Water Resources Control Board Resolution No. 92-49 (As amended April 21, 1994)	Establishes requirements for investigation and cleanup and abatement of discharges. Among other requirements, dischargers must clean up and abate the effects of discharges in a manner that promotes the attainment of either background water quality, or the best water quality that is reasonable if background water quality cannot be restored. Requires the application of Title 23, CCR, Section 2550.4, requirements to cleanups.	Applicable	Applies to groundwater remedial actions	The Navy and state positions on SWRCB Res. No. 92-49 have been documented and included in Section A2.2.1.2. There is a disagreement on whether Res. No. 92-49 is an ARAR. However, if a remedial alternative can be agreed upon, the ARAR disagreement can be documented in the ROD and the remedial action can move forward.

Table 1 (continued)

#	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	RWQCB Comments	Navy Response
7	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240)	State Water Resources Control Board Resolution No. 88-63 ("Sources of Drinking Water Policy") (as contained in the RWQCB's Water Quality Control Plan)	Specifies that, with certain exceptions, all ground and surface waters must have the beneficial use of municipal or domestic water supply.	Applicable	Applies in determining beneficial uses for waters that may be affected by discharges of waste.	This resolution has been included in Section A2.2.1.2 and Table A2-3 as a potentially applicable state ARAR.
8	Drinking Water Act (California Health & Safety Code Section 4010 et seq.)	Title 22, CCR, Section 64400 et seq.	Requirements for public water systems. Includes Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs).	Relevant and Appropriate	The act is legally applicable for an aquifer and associated distribution and pre-treatment system that is currently defined as "public water system" If it is only a potential "Public water system," then the act is relevant and appropriate.	The state MCLs have been included in the ARARs evaluation in Section A2.2.1.2 and Table A2-3. The Navy has determined that the MCLs at Cal. Code Regs. tit. 22, § 64,444 for cis- and trans-1,2-DCE; vinyl chloride; and 1,1-DCA are potential state ARARs for the inland groundwater since they are more stringent than the federal MCLs. However, the Navy has determined that MCLs are not a potential ARAR for shoreline groundwater, since the shoreline groundwater meets the exemption criteria and should not be considered a potential drinking water source.

Table 1 (continued)

#	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	RWQCB Comments	Navy Response
9	Staff Report of the RWQCB, Central Valley Region	"A Compilation of Water Quality Goals"	Provides guidance on selecting numerical values to implement narrative water quality objectives contained in the Basin Plan.	To Be Considered	Performance Standard. To be considered in selecting appropriate numerical values to implement the Basin Plan for setting cleanup levels and discharge limits. The numerical values contained in the staff report may be ARAR's, or Performance Standards, depending on the source of the values.	A compilation is not needed, since there are adequate ARARs identified for this action.

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ATTACHMENT A

MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF THE NAVY AND THE CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Memorandum of Agreement Between
The United States Department of the Navy and
The California Department of Toxic Substances Control

Use of Model "Covenant to Restrict Use of Property" at Installations Being Closed and Transferred by the United States Department of the Navy

1. Background

   a. The purpose of this Memorandum of Agreement (MOA) is to formalize the use of two model environmental restriction covenants (attached) that have been drafted during negotiations between representatives of the United States Department of the Navy (DON) and the California Department of Toxic Substances Control (DTSC).

   b. Under CERCLA Sec. 104, as delegated to DON by E.O. 12580, and implemented pursuant to the National Contingency Plan (NCP – 40 CFR Sec. 300 et seq.) and 10 USC Sec. 2701, et seq., the cleanup of hazardous substances, pollutants and contaminants is required to be at a level that protects human health and the environment. As a result, this protection can be achieved at certain sites by the imposition of "institutional controls" (i.e., ICs – legal mechanisms to protect human health and the environment by restricting access or exposure to the contaminants in question) with or without underlying "engineering controls" (i.e., ECs – engineered mechanisms such as a cap on a landfill, designed to physically insure access or exposure to the contaminants in question is prevented). Collectively these ICs and ECs are called "land use controls" (LUCs).

   c. In the case of property being closed and transferred by DON to a nonfederal entity, it is necessary to insure that these LUCs stay in place and are honored by all future owners and occupants of the property in question, for as long as contamination is present at levels that do not permit unrestricted use. One key way such LUCs can be maintained is by DON's retention of sufficient legal title and interest to insure continuing enforcement of the terms of the LUCs. This retention would entail burdening such conveyances of title with deed covenants insuring that the deed transferring such property contain a formal restriction – a restrictive covenant – on the use of the property that will "run with the land," and is enforceable against the "servient estate" (i.e., all future owners of the land) and is retained by the United States, as represented by DON, acting as holder of the "dominant estate." In addition, DON can convey a separate and similar restrictive covenant to DTSC as provided in

Section 2 below.

d. In the State of California, such a restriction on the use of land, to protect human health and the environment is recognized by Section 1471 of the California Civil Code. This statute characterizes such a restrictive covenant as an "environmental restriction" and requires such words to be placed in the title of the document creating such an interest. DON has agreed to include such restrictive language in the deeds it executes where it imposes LUCs as a remedy under applicable law.

e. Similar to CERCLA, State environmental protection laws recognize the availability of using LUCs as remedies to protect human health and the environment. Currently, DTSC's authority under Chapter 6.5 and 6.8 of Division 20 of the California Health and Safety Code, provides statutory avenues to impose LUCs at a cleanup site to insure that the LUCs are honored by future owners. Chapter 6.5 is generally used when the cleanup site in question is one subject to the State's authorities under the hazardous waste facilities law, and Chapter 6.8 is generally used when the cleanup site in question is one subject to the State's equivalent to the federal CERCLA program.

f. In the case of property being closed and transferred to a nonfederal entity by DON where a cleanup remedy has used LUCs as a remedy as described above, DON and DTSC have a mutual interest in insuring that the "environmental restriction" imposed on the land is enforced for however long the protection of public health and the environment requires such restrictions.

g. As a result, DON and DTSC agree that it is in both parties' and the public's interests, that DTSC be in a position to enforce the "environmental restrictions" that the DON will be imposing on these transferring parcels of property. To this end, in addition to retaining the power to enforce protective covenants, DON agrees to convey a separate power to enforce such restrictive covenants to DTSC equivalent to DON's power to enforce any "environmental restrictions" burdening the transferring property by entering into a "Covenant to Restrict Use of Property." Under both Chapter 6.5 and Chapter 6.8, DTSC has the authority to monitor and enforce such "environmental restrictions" conveyed to it by the owner of property on which such an "environmental restriction" has been found necessary. Therefore, in consideration of DON's conveying such an interest, DTSC may implement as appropriate the various statutory authorities it possesses under Chapter 6.5 and Chapter 6.8 (as applicable) to insure these "environmental restrictions" are honored by all future owners and occupants.

2. Terms of Understanding:

a. DON and DTSC agree that in all future property transfers to a nonfederal agency, where DON is acting on behalf of the United States as the transferring or disposing agent, the applicable model "Covenant to Restrict Use of Property" attached to this MOU will be used throughout California when the proposed remedy involves imposing an IC (except those "early transfers" where 1) the transferee will perform the cleanup, and 2) the cleanup includes an IC in the remedy, and 3) has executed an order or enforceable agreement with DTSC or has entered into a Sec. 25222.1 agreement with DTSC, that calls for the transferee entering into a "Covenant to Restrict Use of Property" directly with DTSC).

b. DON and DTSC have entered into a number of Federal Facility Agreements and Federal Site Remediation Agreements for DON property. These Agreements generally call for coordination of the DON's satisfaction of its corrective action obligations under the Resource Conservation and Recovery Act (RCRA) and Health and Safety Code section 25200.10 with its responsibilities under CERCLA section 120(l), EO 12580, the Defense Environmental Restoration Program and the NCP. The Agreements recognize that the DON may satisfy some or all of its corrective action obligations through CERCLA response actions. Where such corrective action at hazardous waste management units is being satisfied through CERCLA, Attachment A shall be used. Attachment B is the model which will be used for hazardous waste management facilities not addressed in Federal Site Remediation or Federal Facility Agreements.

c. When issuing Proposed Plans for public comment, DON will attach a copy of this MOU and the appropriate model "Covenant to Restrict Use of Property" so as to assure the public that the specific LUC being proposed will be enforced, in part, by DON's retained power to enforce the deed covenants and conveyance of the power to enforce protective deed covenants to DTSC contemporaneously with the execution of the deed transferring DON's interests to the new owner.

d. In using these models to draft the appropriate "Covenant to Restrict Use of Property," DON's and DTSC's personnel will work collaboratively to develop the specific information applicable to the given site called for by Articles I (Statement of Facts) and IV (Restrictions) of the attached models. A final "Covenant to Restrict Use of Property" that is ready for signature for a given site, will be prepared in time to allow it to be

executed contemporaneously with the execution of the deed transferring DON's non-retained interests in the property to the new owner. In the case of "early transfers" where DON is performing the cleanup after the transfer, and is imposing an LUC at the time of the "early transfer" in support of its ongoing cleanup activities, the Parties recognize that the contents of Articles I and IV of the model covenants for such sites will likely not be as detailed as that suggested in the attached models. The degree of detail contained within the model covenant will be the information available as to the cleanup site, although the covenants must be adequate to protect human health and the environment to allow an early transfer. The form of remedy and any additional associated IC will be more fully developed once the remedy is selected and implemented.

e. The Parties recognize that given the need to tailor the terms of the "environmental restriction" to the remedy that is finally selected after seeking public comment on the Proposed Plan, the terms of the final "Covenant to Restrict Use of Property" may vary greatly from the draft proposal. The Parties recognize that the public should be given specific notice of this fact in the Proposed Plan.

f. The Parties recognize that remedies proposed by the DON will be submitted to DTSC for concurrence. However, there may be unresolved disagreements at some cleanup sites concerning the remedy being proposed by DON including, in particular, the scope and nature of the LUCs, and the terms of any underlying, proposed "Covenant to Restrict Use of Property." In such situations the Parties will use their best efforts to resolve all disputes informally. If the Parties are ultimately unable to resolve the issue in dispute, DON and DTSC reserve any rights they might have to take any action available under applicable state or federal law.

g. Either Party may terminate its involvement in this Agreement by giving thirty (30) days written notice to the other Party. Upon receipt of notice and the expiration of thirty days termination shall occur by operation of law.

Signed: _____ 10 MARCH 2000

F.R. Ruehe
Rear Admiral
United States Navy
Commander Navy Region Southwest

Date

Signed: Edwin F. Lowry 3/10/00

Edwin F. Lowry
Director
Department of Toxic Substances Control

Date

Attachment A: Model Site Mitigation Program "Environmental Restriction *Covenant and Agreement*"

Attachment B: Model Hazardous Waste Management Program/State Regulated Unit "Environmental Restriction Covenant and Agreement"

Approved as to form:

Date: 9 March 00 By: Mary Kay Jampen

Approved as to form:

Date: March 16, 2000 By: [signature]

MODEL SITE MITIGATION PROGRAM

DEED RESTRICTION

RECORDING REQUESTED BY: **[Covenantor's Name]** **[Street Address]** **[City], California [Zip Code]** WHEN RECORDED, MAIL TO: Department of Toxic Substances Control Region ___ **[Street Address]** **[City], California [Zip Code]** Attention: **[Name of Branch Chief]**, Chief **[Branch Designation]**	

SPACE ABOVE THIS LINE RESERVED FOR RECORDER'S USE

COVENANT TO RESTRICT USE OF PROPERTY

ENVIRONMENTAL RESTRICTION

(Re: *[Insert parcel number(s) and name of site property to be restricted.]*)

This Covenant and Agreement ("Covenant") is made by and between the United States of America acting by and through the Department of the Navy ("DON") (the "Covenantor"), the current owner of property situated in *[city]*, County of [ ], State of California, described in Exhibit "A", attached hereto and incorporated herein by this reference (the "Property"), and the State of California acting by and through the Department of Toxic Substances Control (the "Department"). Pursuant to Civil Code section 1471(c), Health and Safety Code Sections 25222.1 and 25355.5 the

Department has determined that this Covenant is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials as defined in Health and Safety Code ("H&SC") section 25260. In addition, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104 (42 USC Section 9604), as delegated to the Covenantor by E.O. 12580, ratified by Congress in 10 USC Sec. 2701, et seq., and implemented by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP – 40 CFR Part 300) and implementing guidances and policies, the Covenantor has also determined that this Covenant is reasonably necessary to protect present or future human health or safety or the environment as the result of the presence on the land of hazardous substances, pollutants and contaminants as defined in CERCLA Section 101 (42 USC Section 9601).

The Covenantor and the Department, collectively referred to as the "Parties", therefore intend that the use of the Property be restricted as set forth in this Covenant, in order to protect human health, safety and the environment.

The Covenantor retains sufficient legal title and interest in the subject property to insure continuing enforcement of the protective covenants and agreements contained within this Covenant to Restrict the Use of Property. Further in any subsequent transfers or conveyance of title to nonfederal entities the DON shall burden the property with additional deed covenants that insure that any subsequent deed or transfer contains the protective covenants and right of access and power to conduct monitoring of wastes retained on site. Those covenants and agreements shall be enforceable against the servient estate in that those protective covenants shall run with the land to

all successors and assigns.

ARTICLE I

STATEMENT OF FACTS

1.01 The Property, totaling approximately [acres] [square yards] is more particularly described and depicted in Exhibit "A", attached hereto and incorporated herein by this reference. ***[Exhibit "A" must include the legal description of the property used by the county recorder. This must include the particular description of the boundaries of the area to be subject to a particular use restriction. If the property does not already have a legal description (it generally will not if it is a portion of a larger piece of property) a survey will be required.]*** The Property is located in the area now generally bounded by ***[include narrative description of the area; this will typically be street names: e.g., Main Street on the north, Maple Street on the east, etc.]*** County of [ ], State of California.

1.02 ***[Use this paragraph if imposing additional restrictions on a portion of the Property, for example on a capped portion, or if for any other reason it is necessary to precisely identify any portion of the property, such as an area with groundwater monitoring wells. The purpose of this paragraph is to give the precise location of such areas where use restrictions generally will apply. Renumber following paragraphs accordingly.]*** A limited portion of the Property is more particularly described in Exhibit "B" which is attached and incorporated by this reference ("Capped Property") as defined below ***[or "(other identified) Property"].*** ***[Exhibit B must include a legal description of the exact area(s) being restricted***

and any necessary diagram(s). This will generally require a legal survey and engineering drawing for the Cap or other area to be further restricted.] The [Capped *(or other description)*] Property is located in the area now generally bounded by [ ]. ***[Include language that generally describes the Capped or other identified Property.]*** The [Capped *(or other identified)* Property is also more specifically described as encompassing [ ] County Assessor's Parcel No.(s) [ ].

1.03 ***[Briefly describe the remedial measures implemented at the Property, including, if applicable, installation of a cap and construction and ongoing operation and maintenance of a groundwater treatment system, in order to identify the remaining contaminants and physical remedial measures on the Property that necessitate this deed restriction. This paragraph should also briefly discuss the regulatory context for the DON facility. Reference should be made to any applicable Federal Facility Agreement (FFA) or Federal Facility Site Remediation Agreement(FFSRA) and any corrective action obligations under RCRA or Chapter 6.5 of Division 20 of the Health and Safety Code covered by the FFA or FFSRA. This paragraph should refer to, and give the approval date for, the RAP, ROD, RAW or other decision document that selected the remedial measures at the Property and required this Covenant.]***

SAMPLE [For a facility which has an FFA or FFSRA and hazardous waste management units]: The DON and the Department entered into a Federal Facility Agreement (FFA) on [date]. Pursuant to that FFA, the DON may satisfy some or all of its corrective action obligations under the Resource Conservation and Recovery Act

(RCRA)(42 USC 6901 et seq)or California Health and Safety Code sectin 25200.10 through CERCLA response actions. ***{Proceed to additional SAMPLES as appropriate.]***

SAMPLE [For a property with remaining contamination, but no cap, O&M, or other ongoing response activities]: The Property is [a portion of a site] being remediated pursuant to a Record of Decision (ROD) pursuant to the Defense Environmental Restoration Program (DERP), 10 U.S.C. section 2701 et seq, and CERCLA; and a Remedial Action Plan (RAP) pursuant to Chapter 6.8 of Division 20 of the H&SC, under the oversight of the Department. The ROD/RAP provides that a deed restriction be required as part of the site remediation, because lead, which is a hazardous substance, as defined in H&SC section 25316, and a hazardous material as defined in H&SC section 25260 remains at depths of 10 feet or more below the surface of the Property. The DON circulated the ROD/RAP, for public review and comment. The ROD/RAP was approved by the DON and concurred in by the Department on [date], pursuant to which the Property was excavated to a depth of 10 feet, graded, then backfilled with clean soil.

SAMPLE [For a property with ongoing operation and maintenance of a monitoring or treatment system and/or cap. The exact provisions of this paragraph will vary depending upon the facts of the particular site or facility. The paragraph below is illustrative of the kind of information that should be included. Note specifically there is reference to a signed Operation and Maintenance Agreement.]: [Covenantor] ***[or party responsible for the activity, if different from***

Covenantor] is remediating the Property under the supervision and authority of the Department. The Property is [a portion of a site] being remediated pursuant to a Record of Decision (ROD) pursuant to the Defense Environmental Restoration Program (DERP), 10 U.S.C. section 2701 et seq; and a Remedial Action Plan (RAP) pursuant to Chapter 6.8 of Division 20 of the H&SC. Because hazardous substances, as defined in H&SC section 25316, which are also hazardous materials as defined in H&SC section 25260, including volatile organic compounds, total petroleum hydrocarbons, chlorinated benzenes and polychlorinated biphenyls, remain in the soil and groundwater in and under portions of the Property, the Remedial Action Plan provides that a deed restriction be required as part of the site remediation. The DON circulated the ROD/RAP for public review and comment. The ROD/RAP were approved by the DON and concurred in by Department on [*date*]. Remediation includes installing and maintaining a synthetic membrane cover ("Cap") over the Capped Property. The Cap consists of a low permeability synthetic membrane and other associated layers, as more particularly described in the engineering drawing attached as Exhibit "B" hereto. The response action also includes the installation and operation of: (1) a passive gas collection system on the Capped Property which removes volatile organic compounds migrating upward from under the Cap, (2) a vapor extraction system, which remediates certain volatile organic compound-impacted soils, and (3) groundwater monitoring wells ("Monitoring Wells"). The location of the gas collection system, vapor extraction system, and Monitoring Wells are shown on Exhibit "B". ***[This exhibit will have been identified in paragraph 1.02.]*** The operation and maintenance of the Cap, gas collection system, vapor extraction system, and Monitoring Wells is pursuant to an Operation and

Maintenance Manual incorporated into the Operation and Maintenance Agreement between [Covenantor] ***[or name of other entity]*** and the Department dated [ ]. ***[If an O&M Agreement has not been signed, the approval date for the O&M Manual or Plan should be referenced.]***

1.04 ***[This paragraph should set out specific information about the risk assessment findings relevant to the contaminants of concern remaining at the property, essentially the basis for the restrictions imposed by this covenant. The Restrictions in Paragraphs 4.01, and any requirement for Soil Management Activity and any Prohibited Activity must be linked to the contaminants and risk assessment as discussed in this paragraph. The following paragraph is given for purposes of illustration. Each site will have different facts; those should be developed in a manner similar to the sample paragraph given here. Land use must be consistent with the approved RAW, RAP or ROD and the health risk assessment.]***

SAMPLE: As detailed in the Final Health Risk Assessment ***[or other appropriate document]*** as proposed by the Covenantor and approved by the Department on ***[date]***, all or a portion of the surface and subsurface soils within 10 feet of the surface of the Property contain hazardous substances, as defined in H&SC section 25316, which include the following metal contaminants of concern in the ranges set forth below: arsenic (0.3 to 38.1 parts per million ("ppm"), beryllium (2.6 ppm), copper (4.6 to 756 ppm, and nickel (7.3-105 ppm). In addition, there are low pH soils. Based on the Final Risk Assessment the Department and the Covenantor have

concluded that use of the Property as a residence, hospital, school for persons under the age of 21 or day care center would entail an unacceptable cancer risk to the users or occupants of such property operated or occupied. The Department and the Covenantor have further concluded that the Property, as remediated, and operated or occupied subject to the restrictions of this Covenant, does not present an unacceptable threat to human safety or the environment, if limited to ***[as applicable:*** commercial and industrial, parks, open space,***[or other appropriate]]*** use.

SAMPLE: [Note: Groundwater restrictions in Paragraph 3.04 must be based on a discussion of what contaminants are found in groundwater at the site, and what the drinking water standards are.]

Groundwater at the Property is found 15 to 20 feet below ground surface. Contaminants in the groundwater include benzene (50- 123 ppm), chromium (75- 213 ppm) and TCE (350-780 ppm). California drinking water standards are benzene at 0.08 ppm, chromium at 30 ppm and TCE at 5 ppm. The Department and the Covenantor concludes that the groundwater presents an unacceptable threat to human health and safety absent an environmental restriction to eliminate exposure to such levels of groundwater.

ARTICLE II

DEFINITIONS

2.01 Department. "Department" means the State of California by and through the Department of Toxic Substances Control and includes its successor agencies, if

any.

2.02 Owner. "Owner" shall include the Covenantor's successors in interest, and their successors in interest, including heirs and assigns, during his or her ownership of all or any portion of the Property.

2.03 Occupant. "Occupant" means Owners and any person or entity entitled by ownership, leasehold, or other legal relationship to the right to occupy any portion of the Property.

2.04 Covenantor. "Covenantor" shall mean the United States acting through the Department of the Navy (DON).

ARTICLE III

GENERAL PROVISIONS

3.01 Restrictions to Run with the Land. This Covenant sets forth protective provisions, covenants, restrictions, and conditions (collectively referred to as "Restrictions"), subject to which the Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. These Restrictions are consistent with the separate restrictions placed in the deed by and in favor of the Covenantor, conveying the Property from the Convenantor to its successor in interest described above. Each and every Restriction: (a) runs with the land in perpetuity pursuant to H&SC sections 25222.1 25355.5(a)(1)(C) and Civil Code section 1471; (b) inures to the benefit of and passes with each and every portion of the Property; (c) shall apply to and bind all subsequent Occupants of the Property; (d) is for the benefit of, and is enforceable by the Department; and (e) is imposed upon the entire Property unless expressly stated as applicable only to a specific portion thereof.

3.02 Binding upon Owners/Occupants. Pursuant to H&SC sections 25222.1, 25355.5(a)(1)(C), this Covenant binds all Owners of the Property, their heirs, successors, and assignees, and the agents, employees, and lessees of the owners,

heirs, successors, and assignees. Pursuant to Civil Code section 1471(b), all successive owners of the Property are expressly bound hereby for the benefit of the Department.

3.03 Written Notice of Hazardous Substance Release. The Owner shall, prior to the sale, lease, or rental of the Property, give written notice to the subsequent transferee that a release of hazardous substances has come to be located on or beneath the Property, pursuant to Health and Safety Code section 25359.7. Such written notice shall include a copy of this Covenant. *[This last sentence is optional, to be used at sites where it is important that buyers and tenants be specifically aware of the ongoing remediation and their obligations.]*

3.04 Incorporation into Deeds and Leases. The Restrictions set forth herein shall be incorporated by reference in each and all deeds and leases for any portion of the Property.

3.05 Conveyance of Property. The Owner shall provide notice to the Department not later than thirty (30) days after any conveyance of any ownership interest in the Property (excluding mortgages, liens, and other non-possessory encumbrances). The Department shall not, by reason of this Covenant alone, have authority to approve, disapprove, or otherwise affect a conveyance, except as otherwise provided by law, by administrative order, or by a specific provision of this Covenant.

ARTICLE IV

RESTRICTIONS

[The following examples are intended to be illustrative. Not all of them will be

applicable. The restrictions for a particular property should have a direct relationship to what the Health Risk Assessment said was appropriate for use at the site. The restrictions must also protect the integrity and physical accessibility of, and legal rights of access to, any ongoing remediation facilities at the site.]

4.01 Prohibited Uses. The Property shall not be used for any of the following purposes: *[Note: These prohibitions must be based on the appropriate decision documents as set forth in Paragraphs 1.03 and 1.04]*

[Sample provisions:]

(a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

(b) A hospital for humans.

(c) A public or private school for persons under 21 years of age.

(d) A day care center for children.

4.02. Soil Management *[Note: The basis for the soil restrictions must be in Paragraphs 1.03 and 1.04]*

[Sample provisions]

(a) No activities that will disturb the soil [at or below [ ] feet below grade] (e.g., excavation, grading, removal, trenching, filling, earth movement or mining) shall be allowed on the Property without a Soil Management Plan and a Health and Safety Plan approved by the Department.

(b) Any contaminated soils brought to the surface by grading, excavation, trenching or backfilling shall be managed in accordance with all applicable provisions of

state and federal law.

(c) The Owner shall provide the Department written notice at least fourteen (14) days prior to any building, filling, grading, mining or excavating in the Property [more than [ ] feet below the soil surface] [which will remove more than [ ] cubic yards of soil].

4.03 Prohibited Activities. ***[This paragraph will not be applicable to all sites. If not used, renumber accordingly. If there are groundwater restrictions, the basis must be in Paragraphs 1.03 and 1.04]*** The following activities shall not be conducted at the Property:

[Sample provisions]

(a) Raising of food (agricultural products intended for human consumption or use, including but not limited to food, cattle, fibers, including cotton).

(b) Drilling for [drinking irrigation] water, oil, or gas [without prior written approval by the Department].

[or] (b) Extraction of groundwater for purposes other than site remediation or construction dewatering.

[The following paragraphs are samples of restrictions that may be applicable when there is a cap, vapor and/or gas collection system, and/or groundwater monitoring system.]

4.04 Non-Interference with Cap [and Vapor Extraction System (VES)] and [Groundwater Capture System (GCS)].

[Sample provisions:]

(a) Activities that may disturb the Cap (e.g. excavation, grading, removal, trenching, filling, earth movement, or mining) shall not be permitted on or within _____ feet of the Capped Property without prior review and approval by the Department. ***[Similar restrictions may be appropriate for other ongoing remediation systems.]***

(b) All uses and development of the Capped Property shall preserve the integrity [***(if appropriate:)*** **and physical accessibility]** of the Cap. ***[Extend to other systems as appropriate.]***

(c) The Cap shall not be altered without written approval by the Department.

(d) The Owner shall notify the Department of each of the following: (i) the type, cause, location and date of any damage to the Cap and (ii) the type and date of repair of such damage. Notification to the Department shall be made as provided below within ten (10) working days of both the discovery of any such disturbance and the completion of any repairs. Timely and accurate notification by any Owner or Occupant shall satisfy this requirement on behalf of all other Owners and Occupants. ***[Extend to other systems as appropriate.]***

4.05 Access for Department. The Department shall have reasonable right of entry and access to the Property for inspection, monitoring, and other activities consistent with the purposes of this Covenant as deemed necessary by the Department in order to protect the public health or safety, or the environment.

ARTICLE V

ENFORCEMENT

5.01 Enforcement. Failure of the Owner or Occupant to comply with any of the

Restrictions specifically applicable to include grounds for the Department to require that the Owner modify or remove any improvements ("Improvements" herein shall mean all buildings, roads, driveways, and paved parking areas), constructed or placed upon any portion of the Property in violation of the Restrictions. Violation of this Covenant by the Owner or Occupant may result in the imposition of civil and/or criminal remedies including nuisance or abatement against the Owner or Occupant as provided by law. The State of California shall have all remedies as provided at in California Civil Code Section 815.7 as that enactment may be from time to time amended.

ARTICLE VI

VARIANCE AND TERMINATION

6.01 Variance. The Owner, or with the Owner's consent, any Occupant, may apply to the Department for a written variance from the provisions of this Covenant. Such application shall be made in accordance with H&SC section 25233. The Department will grant the variance only after finding that such a variance would be protective of human, health, safety and the environment.

6.02 Termination. The Owner, or with the Owner's consent, any Occupant, may apply to the Department for a termination of the Restrictions or other terms of this Covenant as they apply to all or any portion of the Property. Such application shall be made in accordance with H&SC section 25234. No termination or other terms of this Covenant shall extinguish or modify the retained interest held by the United States.

ARTICLE VII

MISCELLANEOUS

7.01 No Dedication Intended. Nothing set forth in this Covenant shall be

construed to be a gift or dedication, or offer of a gift or dedication, of the Property, or any portion thereof to the general public or anyone else for any purpose whatsoever.

7.02 Recordation. The Covenantor shall record this Covenant, with all referenced Exhibits, in the County of [name of county] within ten (10) days of the Covenantor's receipt of a fully executed original.

7.03 Notices. Whenever any person gives or serves any Notice ("Notice" as used herein includes any demand or other communication with respect to this Covenant), each such Notice shall be in writing and shall be deemed effective: (1) when delivered, if personally delivered to the person being served or to an officer of a corporate party being served, or (2) three (3) business days after deposit in the mail, if mailed by United States mail, postage paid, certified, return receipt requested:

To Owner: *[include name and address of Owner and name of person to receive service]*

To Department: *[title and address of Regional Branch Chief.]*

Any party may change its address or the individual to whose attention a Notice is to be sent by giving written Notice in compliance with this paragraph.

7.04 Partial Invalidity. If any portion of the Restrictions or other term set forth herein is determined by a court of competent jurisdiction to be invalid for any reason, the surviving portions of this Covenant shall remain in full force and effect as if such portion found invalid had not been included herein.

7.05 Statutory References. All statutory references include successor provisions.

IN WITNESS WHEREOF, the Parties execute this Covenant.

Covenantor: *[name of Covenantor]*

By: _____

Title: *[signatory's name and title]*

Date: _____

Department of Toxic Substances Control

By: _____

Title: *[signatory's name and title]*

Date: _____

Approved as to form:

Date: _____ By: _____

Approved as to form:

Date: _____ By: _____

STATE OF CALIFORNIA)
)
COUNTY OF _____)

On this _____ day of _____, in the year _____,

before me _____, personally appeared

_____,

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is /are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

MODEL HAZARDOUS WASTE MANAGEMENT PROGRAM

DEED RESTRICTION

RECORDING REQUESTED BY: **[Covenantor's Name]** **[Street Address]** **[City]**, California **[Zip Code]** WHEN RECORDED, MAIL TO: Department of Toxic Substances Control Region ___ **[Street Address]** **[City]**, California **[Zip Code]** Attention: **[Name of Branch Chief]**, Chief **[Branch Designation]**	

SPACE ABOVE THIS LINE RESERVED FOR RECORDER'S USE

COVENANT TO RESTRICT USE OF PROPERTY

ENVIRONMENTAL RESTRICTION

(Re: *[Insert parcel number(s) and name of site property to be restricted.]*)

This Covenant and Agreement ("Covenant") is made by and between the United States of America acting by and through the Department of Navy or "DON" (the "Covenantor"), the current owner of certain property situated in *[city]*, County of _____, State of California, described in Exhibit "A", attached hereto and incorporated herein by this reference (the "Property"), and the State of California acting by and through the Department of Toxic Substances Control (the "Department"). Pursuant to Civil Code section 1471(c), the Department has determined that this Covenant is reasonably necessary to protect present or future human health or safety or the environment as a

result of the presence on the land of hazardous materials as defined in Health and Safety Code ("H&SC") section 25260. In addition, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104 (42 USC Section 9604), as delegated to the Covenantor by E.O. 12580, ratified by Congress in 10 USC Sec. 2701, et seq., and implemented by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP – 40 CFR Part 300) and implementing guidances and policies, the Covenantor (DON) has also determined that this Covenant is reasonably necessary to protect present or future human health and safety and the environment as the result of the presence on the land of hazardous substances, pollutants and contaminants as defined in CERCLA Section 101 (42 USC Section 9601).

The Covenantor and the Department, collectively referred to as the "Parties", therefore intend that the use of the Property be restricted as set forth in this Covenant, in order to protect human health, safety and the environment.

The Covenantor retains sufficient legal title and interest in the subject property to insure continuing enforcement of the protective covenants and agreements contained within this Covenant to Restrict the Use of Property. Further in any subsequent transfers or conveyance of title to nonfederal entities the DON shall burden the property with additional deed covenants that insure that any subsequent deed or transfer contains the protective covenants and right of access and power to conduct monitoring interest contained herein and of wastes retained on site. Those covenants and agreements shall be enforceable against the servient estate in that those protective covenants shall run with the land to all successors and assigns.

ARTICLE I

STATEMENT OF FACTS

1.01 The Property, totaling approximately [acres] [—— square yards] is more particularly described and depicted in Exhibit "A", attached hereto and incorporated herein by this reference. *[Exhibit "A" must include the legal description of the property used by the county recorder. This must include the particular description of the boundaries of the area to be subject to a specific use restriction. A survey may be required].* The Property is located in the area now generally bounded by *[include narrative description of the area; this will typically be street names: e.g. Main Street on the north, Maple Street on the east, etc.]* County of [ ], State of California.

1.02 *[Use this paragraph if imposing additional restrictions on a portion of the Property, for example on a capped portion, or if for any other reason it is necessary to precisely identify any portion of the property, such as an area with groundwater monitoring wells. The purpose of this paragraph is to give the precise location of such areas where use restrictions will apply. Renumber following paragraphs accordingly]* A limited portion of the Property is more particularly described in Exhibit "B" which is attached and incorporated by this reference ("Capped Property" or "[*other identified*] Property"). *[Exhibit B must include a legal description of the exact area(s) being restricted and any necessary diagram(s). This will generally require a legal survey and engineering drawing for the Cap or other area to be further restricted.].* The [Capped or {other identified}] Property is located in the area now generally bounded by _____. *[include language that generally describes the Capped or other identified Property]* The

[Capped or {other identified}] Property is also more specifically described as encompassing xxxx County Assessor's Parcel numbers —.

1.03 *[Briefly describe the regulatory oversight of the facility by the Department and the CERCLA decisions including any applicable Federal Facility Agreement (FFA) or Federal Facility site Remediation Agreement (FFSRA) and implementing activities of the Covenantor, the remedial activities that have occurred at the Property, including, if applicable, installation of a cap and construction and ongoing operation and maintenance of a groundwater treatment system. This paragraph should refer to the Closure Report or other decision document such as a ROD which approved the remedial activities at the Property and required this Covenant. The paragraph needs to identify the contaminants and physical remedial measures on the Property which necessitate this deed restriction.]*

Since [*date*] the Department [*or*, the Department's predecessor in interest (California Department of Health Services)] authorized this [treatment], [storage], [disposal] facility ("Facility") pursuant to an [interim status document] [permit]. Under this authorization the Site was a hazardous waste facility, regulated by the Department, subject to the requirements of the California Hazardous Waste Control Law ("HWCL"), at Health and Safety Code ("H&S Code") section 25100 et seq., and the federal Resource Conservation and Recovery Act ("RCRA"), at 42 U.S.C. section 6901 et seq. Pursuant to the closure requirements of the HWCL, including H&S Code section 25246 and post-closure notices provisions of Title 22 California Code of Regulations [section 66265.119(b) for interim status hazardous waste facilities] [*or* 66264.119(b) for permitted hazardous waste facilities]] [*or, if restrictions required for permit:* corrective

action requirements of the HWCL, including H&S Code Section 25200.10] the Department is requiring this Covenant as part of the [facility closure] [corrective action] [permitting] of the facility. The Department circulated a [Closure Plan] [Remedial Measures Study] [*other appropriate document*], which contained a Final Health Risk Assessment [*and/or* Remedial Goals document], together with a draft [Environmental Impact Report] [Negative Declaration] pursuant to the California Environmental Quality Act, Public Resources Code section 21000 et seq for public review and comment from [*date*] to [*date*]. Because hazardous wastes, which are also hazardous materials as defined in Health and Safety Code sections 25117 and 25260, including [list hazardous wastes] remain in the [soil] and [groundwater] at the Property, the [Closure Plan] [Remedial Measures Study] provided that a deed restriction would be required as part of the facility remediation. The Department approved the [Closure Plan] [Remedial Measures Study] [*other appropriate document*] together with the [*environmental document*] on [*date*].

Pursuant to these documents, the Property was [*describe remedial actions taken which relate to what is left on the property. This description must include installation of any physical remedial measures. The description must identify what contaminants remain on the Property.*]

SAMPLE: Hazardous wastes, which are also hazardous materials as defined in H&S Code sections 25117 and 25260, and are CERCLA hazardous substances, pollutants or contaminant, including xxxx and yyyy, remain in the soil and groundwater at the Property. Remediation includes installing and maintaining a synthetic membrane cover ("Cap") over the Capped Property. The Cap consists of a low permeability

synthetic membrane and other associated layers over the hazardous wastes and materials, as more particularly described in the engineering drawing attached as Exhibit "B" hereto. The Remedial Measure also includes the installation and operation of: (1) a passive gas collection system ("GCS") on the Capped Property which removes miscellaneous gas/vapors migrating upward from under the Cap, (2) a vapor extraction system ("VES"), which remediates certain volatile organic compound-impacted soils, and (3) groundwater monitoring wells ("Monitoring Wells"). The location of the GCS, VES and Monitoring Wells are shown on the map attached as exhibit "--". The operation and maintenance ("O&M") of the Cap, GCS, VES, and Monitoring Wells is pursuant to an O&M Manual incorporated into the O&M Agreement between [Covenantor] *[or name of other entity]* and the Department dated September 20, 1995. *[If an O&M Agreement has not been signed, the approval date for the O&M Manual or Plan should be referenced]*

1.04 *[This paragraph should set out specific information about the risk assessment findings relevant to the contaminants of concern remaining at the property, essentially the basis for the restrictions imposed by this covenant. The Restrictions in Paragraphs 4.01, and any requirement for Soil Management Activity and any Prohibited Activity must be linked to the contaminants and risk assessment as discussed in this paragraph. The following paragraph is given for purposes of illustration. Each site will have different facts; those should be developed in a manner similar to the sample paragraph given here. You must consult with the assigned toxicologist about what are the appropriate land uses.]*

SAMPLE: As detailed in the Final Health Risk Assessment *[or other appropriate*

document] as proposed by the Covenantor and approved by the Department on *[date]*, all or a portion of the surface and subsurface soils within 10 feet of the surface of the Property contain hazardous wastes and hazardous materials, as defined in H&S Code section 25117 and 25260, which include one or more of the following metal contaminants of concern in the ranges set forth below: arsenic (0.3 to 38.1 parts per million ("ppm"), beryllium (2.6 ppm), copper (4.6 to 756 ppm, and nickel (7.3-105 ppm). In addition, there are low pH soils. Based on the Final Risk Assessment the Department and the Covenantor have concluded that use of the Property as a residence, hospital, school for persons under the age of 21 or day care center would entail an unacceptable cancer risk to the users or occupants of such property. The Department and the Covenantor have further concluded that the Property, as remediated, and operated or occupied subject to the restrictions of this Covenant, does not present an unacceptable threat to human safety or the environment, if limited to *[as applicable:* commercial and industrial use, parks, open space, [or other appropriate] use*]*.

SAMPLE [Note: Groundwater restrictions in Paragraph 3.04 must be based on a discussion of what contaminants are found in groundwater at the site, and what drinking water standards are.]: Groundwater at the Property is first found at 15 to 20 feet below ground surface. Contaminants in the groundwater include benzene (50- 123 ppm), chromium (75- 213 ppm) and TCE (350-780 ppm). California drinking water standards are benzene at .08 ppm, chromium at 30 ppm and TCE at 5 ppm. The Department and the Covenantor concludes that the groundwater presents an unacceptable threat to human health and safety absent an environmental restriction to eliminate exposure to such levels of groundwater.

ARTICLE II

DEFINITIONS

2.01 Department. "Department" shall mean the State of California by and through the California Department of Toxic Substances Control and shall include its successor agencies, if any.

2.02 Owner. "Owner" shall include the Covenantor's successor's in interest, and their successors in interest, including heirs and assigns, during his or her ownership of all of any portion of the Property.

2.03 Occupant. "Occupant" shall mean Owners and any person or entity entitled by ownership, leasehold, or other legal relationship to the right to occupy any portion of the Property.

2.04 Covenantor. "Covenantor" shall mean the United States acting through the Department of the Navy (DON).

ARTICLE III

GENERAL PROVISIONS

3.01 Restrictions to Run With the Land. This Covenant sets forth protective provisions, covenants, restrictions, and conditions (collectively referred to as "Restrictions"), upon and subject to which the [Property] [Capped Property] [Restricted Property] and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. These Restrictions are consistent with the separate restrictions placed in the deed by and in favor of the Covenantor, conveying the Property from the Covenantor to its successor in interest described above. Each and every one of the Restrictions: (a) shall run with the land in perpetuity pursuant to H&SC sections 25202.5, and 25202.6, and Civil Code section 1471; (b) shall inure to the benefit of and pass with each and every portion of the Property; (c) shall apply to and bind all subsequent Occupants of the Property; (d) are for the benefit of, and shall be enforceable by the State of California; and (e) are imposed upon the entire Property unless expressly stated as applicable only to a specific portion thereof.

3.02 Binding Upon Owners/Occupants. Pursuant to Health and Safety Code section 25202.5(b), this Covenant shall be binding upon all of owners of the land, their heirs, successors, and assignees, and the agents, employees, and lessees of the owners, heirs, successors, and assignees. Pursuant to Civil Code section 1471(b), all successive owners of the Property are expressly bound hereby for the benefit of the covenantee(s) herein.

3.03 Written Notice of Hazardous Substance Release. The Owner shall, prior to the sale, lease, or rental of the Property, give written notice to the subsequent

transferee that a release of hazardous substances has come to be located on or beneath the Property, pursuant to Health and Safety Code section 25359.7. Such written notice shall include a copy of this Covenant. *[This last sentence is optional, to be used at sites where it is important that buyers and tenants be specifically aware of the ongoing remediation and their obligations]*

3.04 Incorporation into Deeds and Leases. The Restrictions set forth herein shall be incorporated by reference in each and all deeds and leases for any portion of the Property.

3.05 Conveyance of Property Covenantor agrees that the Owner shall provide notice to the Department not later than thirty (30) days after any conveyance of any ownership interest in the Property (excluding mortgages, liens, and other non-possessory encumbrances). The Department shall not, by reason of this Covenant alone, have authority to approve, disapprove, or otherwise affect such conveyance. *[This paragraph is optional, to be used, for example, at sites with groundwater treatment systems that will require access by the Department and by the entity responsible for O&M.]*

ARTICLE IV

RESTRICTIONS

[The following examples are intended to be illustrative. Not all of them will be applicable. The restrictions for a particular property should have a direct relationship to what the Health Risk Assessment said was ok/appropriate for use at the site. The toxicologist must be involved with drafting the Restrictions. The restrictions must also protect the integrity of, and access to, any ongoing remediation facilities at the site.]

4.01 Prohibited Uses. The Property shall not be used for any of the following purposes: *[Note: These prohibitions must be based on the facts and Health Risk Assessment as set forth in Paragraph 1.04]*

[sample provisions]

(a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

(b) A hospital for humans.

(c) A public or private school for persons under 21 years of age.

(d) A day care center for children.

4.02 Soil Management *[Note: The basis for the soil restrictions must be in Paragraph 1.04]*

[sample provisions]

(a) No activities which will disturb the soil *[*at or below xxx feet below grade*]* (e.g., excavation, grading, removal, trenching, filling, earth movement or mining) shall be permitted on the Property without a Soil Management Plan and a Health and Safety Plan submitted to the Department for review and approval.

(b) Any contaminated soils brought to the surface by grading, excavation, trenching or backfilling shall be managed in accordance with all applicable provisions of state and federal law.

(c) The Owner will provide the Department written notice at least fourteen (14) days prior to any building, filling, grading, mining or excavating in the Property [more than feet below the soil surface] [which will remove more than cubic yards of soil].

4.03 Prohibited Activities. *[This paragraph will not be applicable to all sites. If*

not used, renumber accordingly. If there are groundwater restrictions, the basis must be in Paragraph 1.04] The following activities shall not be conducted at the Property: *[sample provisions]*

(a) No raising of agricultural products intended for human consumption or use, including but not limited to food,cattle, fibers including, cotton) shall be permitted on the property.

(b) No drilling for *[*drinking/IRRIGATION *]* water, oil, or gas shall be permitted on the Property *[*without prior written approval by the Department*]. [or]* (b) No groundwater shall be extracted on the Property for purposes other than site remediation or construction dewatering. *[The following paragraphs are samples of restrictions that may be applicable when there is a cap, vapor and/ or gas collection system, and/or groundwater monitoring system.]*

4.04 Non-Interference with Cap [and VES] and [GCS].

[sample provisions]

(a) No activities which will disturb the Cap (e.g. excavation, grading, removal, trenching, filling, earth movement, or mining) shall be permitted on or within _____feet of the Capped Property without prior review and approval by the Department. *[Similar restrictions may be appropriate for other ongoing remediation systems.]*

(b) All uses and development of the Capped Property shall preserve the integrity of the Cap. *[Extend to other systems as appropriate.]*

(c) Any proposed alteration of the Cap shall require written approval by the Department.

(d) The Owner shall notify the Department of each of the following: (i) The

type, cause, location and date of any disturbance to the Cap which could affect the ability of the Cap to contain subsurface hazardous wastes or hazardous materials in the Capped Property, and (ii) the type and date of repair of such disturbance. Notification to the Department shall be made as provided below within ten (10) working days of both the discovery of any such disturbance(s) and the completion of any repairs. Timely and accurate notification by any Owner or Occupant shall satisfy this requirement on behalf of all other Owners. *[Extend to other systems as appropriate.]*

4.05 Access for Department. The Department shall have reasonable right of entry and access to the Property for inspection, monitoring, and other activities consistent with the purposes of this Covenant as deemed necessary by the Department in order to protect the public health and safety and the environment.

ARTICLE V

ENFORCEMENT

5.01 Enforcement. Failure of the Owner or Occupant to comply with any of the Restrictions specifically applicable to it shall be grounds for the Department, by reason of this Covenant, to require that the Owner modify or remove any improvements ("Improvements" herein shall include all buildings, roads, driveways, and paved parking areas, constructed or placed upon any portion of the Property constructed in violation of the Restrictions). Violation of this Covenant by the Owner or Occupant may result in the imposition of civil and/or criminal remedies including nuisance or abatement against the Owner or Occupant as provided by law. The State of California shall have all remedies as provided in California Civil Code, Section 815.7, as that enactment may

be from time to time amended.

ARTICLE VI

MODIFICATION AND TERMINATION

6.01 Modification. Any Owner or, with the Owner's written consent, any Occupant of the Property or any portion thereof may apply to the Department for a written modification from the provisions of this Covenant. Such application shall be made in accordance with H&S Code section 25202.6. The Department will grant the modification only after finding that such a modification would be protective of human health, safety and the environment.

6.02 Termination. Any Owner, and/or, with the Owner's written consent, any Occupant of the Property, or any portion thereof, may apply to the Department for a termination of the Restrictions or other terms of this Covenant as they apply to all or any portion of the Property. Such application shall be made in accordance with H&S Code section 25202.6. The Department will grant the termination only after finding that such a termination would be protective of human health, safety and the environment. No termination of the Restrictions or other terms of this Covenant shall extinguish or modify the retained interest held by the United States.

ARTICLE VII

MISCELLANEOUS

7.01 No Dedication Intended. Nothing set forth in this Covenant shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Property, or any portion thereof to the general public or anyone else for any purpose whatsoever.

7.02 Recordation In accordance with HSC Section 25235, the Department will record this Covenant, with all referenced Exhibits, in the County of [name of county] within ten (10) days of the Department's receipt of a fully executed original.

7.03 Notices. Whenever any person gives or serves any notice ("Notice" as used herein includes any demand or other communication with respect to this Covenant), each such Notice shall be in writing and shall be deemed effective: (1) when delivered, if personally delivered to the person being served or to an officer of a corporate party being served, or (2) three (3) business days after deposit in the mail, if mailed by United States mail, postage paid, certified, return receipt requested:

To Owner: *[include name and address of Owner and name of person to receive service]*

To Department: *[include name, address, and appropriate name of Department person to be served]*

Any party may change its address or the individual to whose attention a notice is to be sent by giving written notice in compliance with this paragraph.

7.04 Partial Invalidity. If any portion of the Restrictions or other term set forth herein is determined by a court of competent jurisdiction to be invalid for any reason, the surviving portions of this Covenant shall remain in full force and effect as if such portion found invalid had not been included herein.

7.05 Statutory References. All statutory references include successor provisions.

IN WITNESS WHEREOF, the Parties execute this Covenant.

"Covenantor"

Date:_____ By:_____

"Department"

Date:_____ By:_____

Approved as to form:

Date: _____ By: _____

Approved as to form:

Date: _____ By: _____

STATE OF CALIFORNIA)
)
COUNTY OF _____)

On this _____ day of _____, in the year _____,

before me _____, personally appeared

_____,

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is /are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

ATTACHMENT B

PRINCIPLES AND PROCEDURES FOR SPECIFYING, MONITORING AND ENFORCEMENT OF LAND-USE CONTROLS AND OTHER POST-ROD ACTIONS

PRINCIPLES AND PROCEDURES FOR SPECIFYING, MONITORING AND ENFORCEMENT OF LAND USE CONTROLS AND OTHER POST-ROD ACTIONS

PREAMBLE

Since the Department of Defense (DoD) /Environmental Protection Agency (EPA) Model Interagency Agreement (IAG)/Federal Facility Agreement (FFA) was developed in 1988, EPA and Navy have gained considerable knowledge and understanding about post-Records of Decisions (ROD) activities, especially Land Use Controls (LUCs). Thinking, policies, regulations and procedures concerning LUCs have evolved considerably since DoD and EPA developed the 1988 FFA model language. New statutes and regulations related to LUCs are being considered in many states. Accordingly, EPA and the Department of the Navy (DON) believe that a set of Principles will assist Navy field commands and EPA Regions to better implement our respective Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) responsibilities. The Principles described below do not replace or substitute for any existing CERCLA statutory or regulatory requirement. Rather they provide a mutually agreeable framework to provide a more efficient process to implement LUCs at National Priority List (NPL) installations.

These Principles will guide the EPA and DON personnel involved in these decisions. They are written in full knowledge that state regulatory and trustee organizations have independent responsibilities and authorities. EPA and the DON recognize the importance of the state role in helping to ensure a cleanup is protective of human health and the environment. Headquarters EPA and DoD will jointly develop a communications plan to ensure we include the states in this important issue.

These Principles support the President's Management Agenda by focusing on improving environmental results. The Principles encourage continued innovation and improvement in CERCLA implementation. EPA and the Components should continue to propose and pilot initiatives at Component installations or at other properties for which they are responsible. This includes proposing variations in, or alternatives such as performance-based practices to, the approach described in this document.

PRINCIPLES

- At sites where remedial action is determined necessary to protect human health and the environment, the actions must be documented in accordance with CERCLA and its implementing regulation, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

- At sites where contaminants are left in place at levels that do not allow for unrestricted use, LUCs are used to ensure that the contaminants do not pose an unacceptable risk to human health or the environment. LUCs consist of engineering controls and/or institutional controls.

- The EPA and DON desire to ensure that LUCs are specified, implemented, monitored, reported on, and enforced in an efficient, cost-effective manner that ensures long-term protectiveness. In addition, in accordance with CERCLA and the NCP, if an equally protective but more cost-effective remedy is identified, DON may propose, and EPA will consider, using the more cost-effective remedy.

- The EPA acknowledges the DON's role and responsibilities as the Federal Lead Agent for response actions. This role includes selecting remedies with EPA at NPL sites and funding response actions.

- The DON acknowledges EPA's role and responsibilities for regulatory oversight and enforcement at NPL sites. This role includes ultimate ability to select the remedy at NPL sites if EPA disagrees with DON's proposed remedy and dispute resolution fails.

- Federal Facilities Agreements (FFAs) are CERCLA 120 agreements used by DON and EPA to describe in detail the roles and relationships among DON, EPA and often the state. They form the foundation for these relationships regarding DON's response actions at NPL sites. FFAs also contain installation specific details and procedures for planning, budgeting, and dispute resolution. DON and EPA desire FFAs to be as standardized as possible and relatively static (i.e., the FFA should not need to be changed for a given installation).

- Primary Documents developed under the FFA are relatively dynamic and document important plans and actions. In that sense, they are action-oriented. For example, a Site Management Plan is revised yearly via collaboration among DON and EPA remedial project managers and is an important tool for planning response actions and demonstrating commitment to the public. Likewise, a LUC Remedial Design (RD) or Remedial Action Work Plan (RAWP) describes those actions that are needed to ensure viability of both long-term engineered and institutional control remedies.

- Records of Decision should document the remedy selection process and remedy decision in accordance with CERCLA and the NCP, as well as applicable and

appropriate guidance, regulations, standards, criteria, and policy. With regard to LUCs, the ROD should describe the LUC objectives; explain why and for what purpose the LUCs are necessary, where they will be necessary, and the entities responsible for implementing, monitoring, reporting on and enforcing the LUCs. The ROD will refer to the RD or RAWP for implementation actions.

- Where situations arise (such as new cleanup standards; new or additional contamination is discovered on a site, etc.) that require additional response actions that go beyond the actions and objectives described in a ROD, and any related ROD Amendment or Explanation of Significant Difference (ESD), the additional actions required and their remedial objectives will be further documented in an ESD or ROD Amendment, as appropriate. There may also arise situations after a remedy has been completed that require removal actions to protect human health and the environment, such as the newly discovered contamination posing an imminent risk to human health. In such circumstances, documentation as required in the removal process should be created.

- Given the above, EPA and DON agree that the most efficient framework for specifying, implementing, monitoring, reporting on and enforcing LUCs is:
  - a standard FFA for NPL sites,
  - a clear, concise RoD with LUC objectives, and
  - a RD or RAWP with LUC implementation actions.

Note: These documents are described more fully below.

- EPA and DON will move expeditiously to finalize all outstanding FFAs using a standard FFA template as a guide to minimize the development/writing process.

Note: A "standard FFA" means the Agreement presently being used between EPA and DoD using the DoD-EPA model language, plus site-specific statements of fact, plus the additional primary document shown in Attachment (1).

- EPA and DoD will initiate a task force with appropriate headquarters and field representatives from EPA and the military services. The task force will make recommendations as to how to ensure that the same documentation can be used to memorialize both remedial action completion and deletion, as well as to determine the process whereby DoD and EPA will document the completion of the remedial actions required by the ROD in a single primary document. The task force will examine ways to reduce document size, review time, and revisions. The task force will recommend changes to guidance and policy that will help reduce document

size or streamline the process in order to manage costs. The task force may also include other stakeholders.

After reviewing the task force recommendations EPA and DoD will determine how to ensure that the same documentation can be used to memorialize both remedial action completion and deletion, as well as to determine the process whereby DoD and EPA will document the completion of the remedial actions required by the ROD in a single primary document. In addition, EPA and DoD will streamline the remedial process and better manage costs. While the efforts of the Task Force are meant to complement the Principles described above, its work is separate from the Principles and must not impede their implementation. The work of the Task Force also must not impede completion or closeout of individual sites or operable units.

GENERAL PROCEDURES

1. Federal Facility Agreement

- The LUC implementation and operation/maintenance actions will be included in the RD or RAWP which are already primary documents deliverable under standard FFAs. In addition, the same documentation as determined by the task force and approved by the Parties to memorialize both the remedial action completion and deletion will be provided as a primary document for new FFAs. For existing FFAs without such a primary document, this document will be provided as an attachment to the RD or RAWP with the same enforceability as a primary document.

Note: Model FFA language will need to be supplemented to reflect these Principles and Procedures. Attachment (1) contains necessary modifications to FFA language.

2. Record of Decision

- It is EPA's and DON's intent that Records of Decision (RoDs) continue to be consistent with CERCLA and the National Contingency Plan. Relative to land use controls and institutional controls, the ROD shall:
  - Describe the risk(s) necessitating the remedy including LUCs;
  - Document risk exposure assumptions and reasonably anticipated land uses;
  - Generally describe the LUC, the logic for its selection and any related deed restrictions/notifications;
  - State the *LUC performance objectives*. (See attachment (2) for examples of

LUC performance objectives);
- List the parties responsible for implementing, monitoring, reporting on, and enforcement of the LUC;
- Provide a description of the area/property covered by the LUC (should include a map);
- Provide the expected duration of the LUCs; and
- Refer to the RD or RAWP for LUC *implementation actions*, since these details may need to be adjusted periodically based on site conditions and other factors. (See attachment (2) for examples of LUC implementation actions).

- The ROD at transferring properties will need to be crafted based on the responsibilities of the new owner and state-specific laws and regulations regarding LUCs. At transferring properties, compliance with the LUC performance objectives may involve actions by the subsequent owners in accordance with deed restrictions, however, ultimate responsibility for assuring that the objectives are met remains with DON as the party responsible under CERCLA for the remedy. DON and regulators will consult to determine appropriate enforcement actions should there be a failure of a LUC objective at a transferred property.

3. LUC Remedial Design (RD) or Remedial Action Work Plan (RAWP)

- The RD or RAWP will be provided as a primary document in accordance with the FFA.
- The RD or RAWP will describe short and long-term implementation actions and responsibilities for the actions in order to ensure long-term viability of the remedy which may include both LUCs (e.g., institutional controls) and an engineered portion (e.g., landfill caps, treatment systems) of the remedy. The term "implementation actions" includes all actions to implement, operate, maintain, and enforce the remedy. Depending on the LUC and site conditions, these actions can include:
- Conducting CERCLA five-year remedy reviews for the engineered remedies and/or LUCs.
- Conducting periodic monitoring or visual inspections of LUCs; frequency to be determined by site-specific conditions.
- Reporting inspection results.
- Notifying regulators prior to any changes in the risk, remedy or land use including any LUC failures with proposed corrective action.
- Including a map of the site where LUCs are to be implemented.

For active bases,

- Developing internal-DON policies and procedures with respect to LUC monitoring, reporting, and enforcement in order to institutionalize LUC management and to ensure base personnel are aware of restrictions and precautions that should be taken; Consulting with EPA at least 14 days prior to making any changes to these policies and procedures to ensure that any substantive changes maintain a remedy that is protective of human health and the environment.
- Developing a comprehensive list of LUCs with associated boundaries and expected durations.
- Notifying regulators of planned property conveyance, including federal-to-federal transfers. "Property conveyance" includes conveying leaseholds, easements and other partial interests in real property.
- Obtaining regulator concurrence before modifying or terminating land use control objectives or implementation actions.

For closing bases/excess property:

- Notifying regulators of planned property conveyance, including federal-to-federal transfers.
- Consulting with EPA on the appropriate wording for land use restrictions and providing a copy of the wording from the executed deed.
- Defining responsibilities of the DON, the new property owner and state/local government agencies with respect to LUC implementation, monitoring, reporting, and enforcement.
- Providing a comprehensive list of LUCs with associated boundaries and expected durations.
- Obtaining regulator concurrence before modifying or terminating land use control objectives or implementation actions.

Note: The mix of responsibilities among DON, the new property owner, and other government agencies depends on state and federal laws and regulations that are applied in the state. Implementation actions at closing bases may include elements characteristic of both active and closing bases, depending on the timing of transfer.

- Should there be a failure to complete LUC implementation actions at an active base, the EPA Region shall notify the installation and seek immediate action. Should there be a failure to complete LUC actions after such notification to the base, EPA may notify the Deputy Assistant Secretary of the Navy (Environment) who will ensure that LUC actions are taken.

- Should there be a failure to complete implementation actions that are the responsibility of a subsequent owner or third party at a transferred property, EPA and DON will consult on the appropriate enforcement action. Should there be a failure to complete implementation actions that are the remaining responsibility of DON at a transferred property, the EPA Region will notify the cognizant Navy Engineering Field Division. If necessary, EPA may notify the Deputy Assistant Secretary of the Navy (Environment) who will ensure that corrective action is taken.

  Note: The RD or RAWP should contain no more or no less implementation actions than needed to ensure the viability of the remedy. There is a delicate balance required. EPA and DON both desire to ensure protectiveness while minimizing process and documents. The parties agree to work diligently to define the appropriate implementation actions for each LUC. EPA and DON believe the key elements can be easily developed between RPMs in a matter of a few hours. Based on detailed discussions and the examples shown in Attachment (2), EPA and DON expect that the LUC portion of the RDs or RAWPs to be in the range of 2-6 pages. If combined with a sampling plan, there may be additional pages needed to list the analyses, sampling locations and frequencies.

4. LUC Data

- The DON will ensure that all LUCs at its installations are included in the Service LUC database.

Attachments:
1. Incorporating Land Use Control (LUC) Objectives and Implementing Actions into Federal Facilities Agreements (FFAs)
2. Examples of LUC objectives and LUC Implementation Actions

Attachment 1

INCORPORATING LAND USE CONTROL (LUC) OBJECTIVES AND IMPLEMENTATION ACTIONS INTO FEDERAL FACILITIES AGREEMENTS (FFAs)

FFA Model Template Additions/Changes

1. Definitions Section:

Add: "Land use controls" shall mean any restriction or administrative action, including engineering and institutional controls, arising from the need to reduce risk to human health and the environment.

2. Primary Documents:

Add: A document memorializing remedial action completion.

Note: EPA and DoD believe it is important that a primary document: (1) document the completion of remedy-in-place and/or site close-out and (2) receive concurrence from EPA. The task force discussed above will make recommendations on the scope and content of the document, and DoD and EPA will determine this document after reviewing the task force recommendations. In the meantime, EPA and DON shall enter into FFAs which include a primary document memorializing remedy completion. The document shall not duplicate information in the Administrative Record or previously provided to EPA. Previously provided information shall be referenced and itemized. New information/data (e.g., sampling data) may be needed to demonstrate that the Remedial Action Objectives have been met. The report shall also include any as-built drawings for remedies if different from the remedial design. EPA and DoD do not envision this to be a lengthy document, but shall contain only the information needed to justify the remedy completion. EPA and DoD believe the document should discuss how the remedial objectives in the ROD have been met. It should not be used to expand the scope of requirements beyond the remedial actions required in the original ROD or any subsequent amendment or explanation of significant difference. Instead, if new requirements are needed for a protective remedy, these will be documented in an Explanation of Significant Difference or ROD Amendment, as appropriate, prior to reaching the milestone. The EPA and DoD will determine the precise nature of this document after reviewing the task force's recommendations.

Change: Eliminate the sub-bullets (subsidiary documents) under remedial action work plan for document streamlining purposes.

ttachment 2

EXAMPLES OF LUC OBJECTIVES AND LUC IMPLEMENTATION ACTIONS

(*Note:* Actions are to be tailored to site-specific conditions.
This is neither a mandatory nor a complete list)

LUC OBJECTIVES (contained in ROD)

- Ensure no construction on, excavation of, or breaching of the landfill cap.
- Ensure no residential use or residential development of the property.
- Ensure no withdrawal and/or use of groundwater.
- Ensure no excavation of soils without a use permit and special handling procedures.

LUC IMPLEMENTATION ACTIONS (contained in the RD or RAWP)

- Conduct a CERCLA five-year remedy review of the LUC and provide to EPA for review.
- Conduct annual inspections of the LUC and report results (active or BRAC – responsible party to be defined).
- Record the LUC in the base master plan. (active)
- Produce a survey plat of the LUC by a state registered land surveyor. (active or BRAC).
- File the survey plat with the local government/Circuit Court for purposes of public notification (active or BRAC)
- Place a survey plat in CERCLA administrative record, and send copies to EPA and state. (active or BRAC).
- Develop and implement a base procedure that requires excavation to be approved by the Public Works Officer or equivalent official. (active)
- Develop and implement a base procedure that requires changes in land use to be approved by the Public Works Officer or equivalent official. (active)
- Notify the regulatory agencies 45 days in advance of any Base proposals for a major land use change at a site inconsistent with the use restrictions and exposure assumptions described in the RoD, any anticipated action that may disrupt the effectiveness of the land use controls, any action that might alter or negate the need for the land use controls, or any anticipated transfer of the property subject to the land use controls.
- Obtain regulator concurrence before modifying or terminating land use control objectives or implementation actions.
- Maintain a comprehensive list of LUCs with associated boundaries and expected durations.

Note: These examples are consistent with draft EPA guidance: "Describing Institutional Controls in Remedy Decision Documents at Active Federal Facilities".